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INFORMATION CENTRE

BULLETIN

NO. 19

Royal Commission on the
Ocean Ranger Marine Disaster

Canada



Commission Royale sur le
Désastre Marin de l'*Ocean Ranger*

Newfoundland/Terre-Neuve



Royal Commission on the
Ocean Ranger Marine Disaster

Canada



Commission Royale sur le
Désastre Marin de l'*Ocean Ranger*

Newfoundland/Terre-Neuve

Government
Publications

INFORMATION CENTRE

BULLETIN

NO. 19

February 2, 1983

Commissioners/Commissaires

Chief Justice T. Alexander Hickman, Chairman/Président
The Honourable Gordon A. Winter, O.C., Vice Chairman/Vice-Président
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Jan Furst, P. Eng.
M.O. Morgan, C.C.
N. Bruce Pardy, P. Eng.

Counsel/Counseiller Juridique

Leonard A. Martin, Q.C.
David B. Orsborn

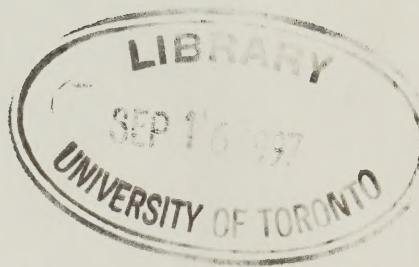
Commission Secretary/Secrétaire de la Commission

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CONTENTS

BULLETIN NO. 19

Section A: Selected clippings (includes journal articles)

*Section E: Information Centre News

* Section E "Information Centre News" is included in in-house copies only.

SECTION A

SELECTED CLIPPINGS

Ottawa will reduce tax on natural gas

OTTAWA (CP) — The federal Government will cut a tax on natural gas to ensure that the domestic price remains at low levels set by the national energy program and agreements with the producing provinces, Finance Minister Marc Lalonde said yesterday. Mr. Lalonde said officials are studying what changes will be necessary in the special levy that keeps natural gas prices at about 65 per cent of the cost of crude oil at Toronto. He told the House of Commons that an announcement could be expected soon. The price of natural gas is scheduled to increase by 25 cents a thousand cubic feet next Tuesday under pricing agreements reached with the Western provinces.

Firm pleads guilty after NWT oil spill

YELLOWKNIFE (CP) — Esso Resources Ltd. has pleaded guilty to a pollution charge following an oil spill from a barge at Bear Island near the company's refinery at Norman Wells in the Northwest Territories last summer. The federal Ministry of Transport laid the charge under the Canada Shipping Act for discharging a pollutant into the Mackenzie River. The company was remanded to Feb. 28 in Territorial Court in Norman Wells for sentence. A second charge will be dealt with at that time. The northern affairs program of the Department of Indian Affairs and Northern Development has also charged Esso with unlawfully permitting the deposit of waste in waters under the Northern Inland Waters Act.

G. E. M.
Jan. 27/83
P. 5

Gas tax cut hinted to keep price in line

By PAUL TAYLOR

The federal Government may be forced to reduce its taxes on natural gas in order to keep its pledge to hold the wholesale price to 65 per cent of the cost of crude oil.

During Question Period in the House of Commons yesterday, federal Finance Minister Marc Lalonde said he is reviewing the situation. He added that the tax on natural gas and natural gas liquids could be "lowered considerably" and that he will

soon be making an announcement on the matter.

As part of its National Energy Program, the federal Government has been trying to encourage consumers and industries to switch from high-cost oil to natural gas. In particular, Ottawa promised to hold the wholesale price of natural gas at a level that is equal to 65 per cent of the wholesale cost of crude oil in Eastern Canada.

But natural gas prices have already hit the 65 per

cent ceiling — and they will soon surpass it. On Feb. 1, for example, the border price of Alberta natural gas is scheduled to go up by another 50 cents a thousand cubic feet.

(The border price of Alberta natural gas is raised by 50 cents every six months, under the terms of an energy pact that was signed by Ottawa and Alberta in September, 1981.)

Natural gas distributors in Eastern Canada are worried that their competi-

tive position will be eroded if the gap between oil and natural gas prices is narrowed. They have been urging Ottawa to reduce its taxes on natural gas.

As things stand now, there are two federal taxes placed on the wholesale price of natural gas.

One tax, which stands at 15 cents a 1,000 cubic feet, is called the Canadian Ownership Charge.

This is used to pay for Petro-Canada's purchases of foreign-owned oil companies. The other tax, called the Natural Gas

stiff competition from the oil industry even if Ottawa is able to keep wholesale gas prices at the 65 per cent level. For one thing, the wholesale price is much different from the final price.

The recession has pushed down the demand for oil so that there is now a glut of oil being produced at refineries in Eastern Canada. Oil companies have been forced to cut prices for many of their products, making them more competitive with natural gas.

and Natural Gas Liquids Tax, now stands at 83 cents a 1,000 cubic feet.

Robert Martin, president of Consumers' Gas Co. Ltd. of Toronto, said a big portion of the price of natural gas actually represents taxes. According to his estimates, the average natural gas consumer in Southern Ontario paid about \$777 in fuel bills last year. Of this amount, about \$108 represented taxes.

However, some observers believe natural gas distributors would face

G. C. M.
Jan. 27/83
P. B1

Inquiry lawyers to New Orleans

Lawyers for the Ocean Ranger Royal Commission are in New Orleans this week to talk to former employees of ODECO who were involved with the design and construction of the Ocean Ranger oil rig which sunk off the shores of Newfoundland last February.

The four men worked for ODECO the company that owned the rig, when it was being built in Japan.

Late last year, the commission requested that the four former employees of ODECO testify at the Ocean Ranger Marine Disaster Inquiry.

ODECO refused the commission's request at first but later changed its mind on the decision.

The lawyers will interview the four men in New Orleans to see just how significant their testimony might be to the inquiry.

D.N

Jan. 27/83

Satellite station may stay, but little hope for workers

From the
Ottawa Bureau
Of The Evening Telegram

The federal government is looking at "alternative solutions" to closing the satellite receiving station at Shoe Cove, Energy Minister Jean Chretien said.

But Chretien offered little hope for the skilled technicians who work at the facility, located 21 kilometres from St. John's. The federal government has decided to close the station because of rising costs.

A second station at Prince Albert, Sask., will process data for a new \$1.2 million satellite receiving station at Churchill, Man., the geographic centre of the country. Under a new U.S. user-pay policy for satellites, Canada would have to pay \$600,000 annually, up from \$50,000, for data received at Shoe Cove.

The Newfoundland station was established in 1977 to receive data from the U.S. LANDSAT satellite. The data provided information on weather and ice conditions for the Atlantic, Eastern Seaboard and offshore regions of Canada.

The issue was raised in the Commons by St. John's East MP James McGrath, in whose district the Shoe Cove station is located. Closing the station "will leave a very serious gap in our search and rescue capability in terms of, for example, tracking ice and getting immediate data on ice movements which seriously impact on the safety of offshore waters."

The Progressive Conservative MP quoted what he called a senior Petro Canada official as saying Shoe Cove is "a necessary element to the safety and efficiency of frontier exploration."

Chretien told the House that his department is "looking into the problem at this time and there is some discussion about alternative solutions to the problem, and I will advise if we can change the decision. But so far this decision was made because of higher costs to operate that than it was before."

Federal officials say the data that has been received at Shoe Cove will still be available from American sources. Critics of the decision to close the station, including customers of Shoe Cove, say it will take several weeks to obtain data needed immediately.

E.T.

Jan. 27/83

P. 5

ODECO's profits at record for 1982

Record 1982 profits were announced Wednesday by New Orleans-based Ocean Drilling & Exploration Co., along with a prediction that drilling by mobile offshore rigs will increase by the end of 1983.

"While the outlook for any immediate improvement in the (mobile rig) market is not favorable," said Hugh J. Kelly, ODECO's president, "we believe that by mid-1983 the active rig count will stabilize, and by year-end, utilization will be on the increase worldwide.

In January 1982, Kelly said, the entire world fleet of mobile offshore rigs was at work. By year-end, 107 of a worldwide total of 605 were idle. ODECO had seven rigs idle at year end out of a fleet of 42, Kelly said.

Kelly added, "The number of wells being drilled on offshore waters has never been greater and the record number of domestic lease sales to be held in 1983 will provide a solid base for increased exploratory drilling in the area hardest hit, the Gulf of Mexico."

For 1982, net income rose to a record \$192 million or \$3.71 a share, up 9.7 percent from \$175 million or \$3.36 in 1981.

Last year was ODECO's first with

gross revenues of more than \$1 billion. Revenues were \$1.02 billion last year and \$925 million in 1981.

Net income rose 4.4 percent in 1982's fourth quarter to \$47.1 million or 91 cents a share on revenues of \$270 million.

In 1981's fourth quarter, net income was \$45.1 million or 87 cents a share on revenues of \$249 million.

ODECO's contract drilling revenues rose 13.8 percent last year from 1981, but oil and gas revenues dropped 5.2 percent.

Contract drilling revenues were \$461 million last year and \$405 million in 1981. ODECO's drilling-rig utilization fell, however, to 91 percent last year from 94 percent in 1981.

Oil and gas revenues were \$462 million last year and \$488 million in 1981.

Other 1982 revenues were \$57.1 million of diving revenues, \$16.4 million of equity in net income of unconsolidated subsidiaries and jointly owned companies, \$24.9 million of interest and other revenues.

Oil production rose to 32,316 barrels a day in 1982 from 31,039 in 1981. Net natural gas production declined to 85.6 million cubic feet a day from 90.4 million in 1981.

New Orleans Times

- Pilayune

Jan. 27, 1983

Canadian courts must hear claims from Explorer

A judge of the U.S. Southern District Court in Houston, Texas, has ruled that Canada and not the United States is the proper forum for hearing lawsuits brought as a result of the sinking of the Arctic Explorer.

Thirteen people drowned when the vessel, owned by Carino Co. Ltd. of Dildo, and chartered to Geophysical Services Inc. of Houston, sank off Cape Bauld July 3, 1981.

Ten of the victims were Canadians, two were Australians and one an American.

The judge ruled that all the suits, including the one filed by the American's family, should be heard in Canada. Four suits have been filed in Canada as a result of the sinking.

A St. John's lawyer, who was not involved in the case but who has been studying suits arising from marine disasters in American waters or involving Americans lost in other countries, said in recent years U.S. courts have been refusing to hear suits involving accidents in other countries.

A recent amendment to the Jones Act would prohibit foreign nationals from suing in the U.S. where there are legal remedies in their native countries.

The judge's decision in the Arctic Explorer suits may be a precursor to similar actions filed in relation to the Ocean Ranger disaster. The U.S. District Court in New Orleans is scheduled to hear arguments on March 11 on where the suits should be heard — Canada or the U.S.

E.T.

Jan. 28/83

P. 3

Settlement insignificant says foundation official

Cle Newhook, executive administrator of the Ocean Ranger Families Foundation says there is no relation between the fact that a \$100 million insurance claim on the rig has been settled, and the organization's efforts in pursuing damage suits.

"From the foundation's point of view, it (the settlement) is totally insignificant," said Newhook. The only way he imagines anybody could have felt there to be a relation would be if the rig's owners had been perceived as unable to pay out sizable settlements to the families. Newhook says he doubts that anyone thought the rig's owners are poor.

He says the "only possible" connection in the issue is that the Ocean Drilling and Exploration Company (ODECO) may now feel a "moral obligation" to settle the issue of redress.

The company has offered cash settlements to some families and they have for the most part been turned down.

Newhook was asked if the insurance settlement might have a positive psychological effect on families about to bring suits against the rig owners and operators.

"Not if they were realistic," he answered.

E.T.

Jan. 28/83

P.3

8

By DARLENE SCOTT
of The Evening Telegram

The largest insurance claim in 1982 against the London Institute of Underwriters in England was for the loss of the oil rig Ocean Ranger, the Associated Press has reported.

Payments on claims related to the rig, 18 jet crashes and the loss of the Atlantic Conveyor in the Falklands War made 1982 the Institute's most costly year on record. Total payments were not made public but an announcement indicated the losses associated with the sunken rig were in the vicinity of \$100 million.

The institute is a consortium of 106 insurance companies and is a leading transport-insurance syndicate.

The Ocean Ranger was owned by the Ocean Drilling and Exploration Company (ODEC) and leased to Mobil Oil, the firm which operated the rig on the Grand Banks for a consortium of oil companies.

John O'Neill, a lawyer for ODEC in St. John's, said he was unaware of the relationship between his client and the insurance syndicate and that he was not involved in the settlement.

ODEC and Mobil Oil, along with at least six other companies are the subject of suits for damages by families of victims of the disaster, which have been filed in both Newfoundland and American courts.

Lawyers for the families want the cases heard in the United States where settlements are generally larger than those in Canadian damage suits, and have only filed the Canadian writs as a protective measure. Lawyers feared that if the American courts decide they do not have jurisdiction to hear the cases, the families will have lost out on any chance to sue the firms unless the Canadian suits had been filed within the deadline for filing such actions.

Word has surfaced through the media that American lawyers for the families will argue the case should be heard in New Orleans, where the American suits are filed, because ODEC is known to have directed its offshore operations from that headquarters.

O'Neill says there is nothing new about the revelation, only that it has not been made public until this time.

"That's always been their contention," he said Thursday after hearing about the reports. He says the argument would have been included in documentation being filed with the American court, in advance of a March 11 hearing on jurisdiction.

"That's only one of many, many arguments," says John Bruce, a lawyer who, along with Leo Barry, in the firm of Halley, Hunt, represents families of the victims.

Bruce said he did not wish to reveal further arguments that will be brought forth. Barry is in Winnipeg.

Meanwhile, only 22 claims for compensation under the province's workers' compensation scheme have been filed with the Workers' Compensation Board (WCB), says chairman Ed Maynard.

Claims began in August of 1982 and up to December, 22 had been filed and processed. Maynard says more than 50 families may be eligible for compensation.

Rig workers who died in the disaster were all earning in excess of the "maximum compensable earnings level" of \$21,000 which was in effect at the time, said Maynard, and most settlements have been in the order of a \$39,000 lump-sum payment with disbursements of more than \$900 monthly for life, besides benefits for dependent children.

Claims for compensation are usually required within six months of an accident, said Maynard, but in the case of the Ocean Ranger, that deadline has been extended to three years.

Workers' compensation legislation was amended to allow survivors to sue third parties (parties other than direct employers) who may be discovered liable in accidents, without the survivors of victims losing their rights to compensation.

But, Maynard points out, if the survivors do accept compensation and then win law suits awarding financial damages, they are obligated to return whatever compensation had been disbursed by WCB. Maynard says this clause is not likely keeping people from applying for workers' compensation. Instead, he says, many survivors may have been awarded life insurance benefits which financially frees them from the need to apply. The insurance benefits would not have been deducted from WCB benefits said Maynard, but he is of the understanding that families of the victims have been advised by their lawyers not to seek workers' compensation if financially possible, for fear the action might prejudice American court action.

Families of the victims, under the current law of the province, are not able to sue actual employers of victims, although writs have been issued against those employers. Lawyers may argue in court that the workers' compensation legislation is invalid on the offshore.

WCB is watching the court proceedings and legal arguments very closely, said Maynard.

Ranger's loss was top claim for insurers

E.T.

Jan. 28/83

P.3

Oil exploration booming off Nova Scotia's coast

By Don McLeod

HALIFAX (CP) — The quizical expression, grin, and shrug of Energy Minister Ron Barkhouse of Nova Scotia said it all Wednesday.

"Peckford said it was no better than the Nova Scotia agreement?" he asked. "They like to criticize our agreement, don't they?"

His comments came just moments before an unprecedented meeting here of oil industry officials and provincial government authorities, partners in the Venture gas development — Nova Scotia's best offshore petroleum prospect.

The first meeting the partners have held outside Western Canada coincided with a frantic exchange of telephone calls and telegrams between St. John's, Nfld., and Ottawa after the sudden revelation Tuesday night that efforts toward an offshore agreement for that province have hit shoal water, or worse.

Newfoundland officials, led by Premier Brian Peckford, have rejected the type of offshore agreement signed by Nova Scotia and, amid the latest negotiating problem, said Ottawa appears to have reverted to that offer.

Since Nova Scotia and the federal government signed an offshore pact last March, there has been a stream of exploration announcements.

SELLS THE FARM?

Neither the province nor the federal government has missed many opportunities to draw attention to that fact, despite accusations that Premier John Buchanan "sold the farm" to get a deal.

Earlier this month, with announcement of a new drilling program on a block of the offshore where Mobil Canada Ltd. holds exploration rights, Buchanan said it would bring the offshore investment committed in the province to almost \$3 billion.

Before the deal was signed with Ottawa, there was one rig working off Nova Scotia. The current total is six and it could be at least eight, possibly more, by the end of the year.

That, he said, was the proof of the pudding.

Chief spokesman for those meeting here was Bill Mason, president of Mobil Oil Canada Ltd. Others included J.N. Stanford, president of Petro-Canada Resources Ltd., and W.A. Gatenby, president of Texaco Canada Resources Ltd.

Mason, who said his company has three rigs working off Newfoundland, declined substantial comment on the dispute.

He said he believes the inability of the major oil producing countries to agree on prices and production levels is a short-term thing that will have no effect on Venture or other East Coast exploration.

AVOIDS THE DISPUTE

He also declined to be drawn

into a discussion of the effects of lower oil prices on the profitability of the East Coast reserves, except to say "obviously there is a price below which you cannot go...."

Mason was asked about Stanford's Jan. 18 statement to a legislature committee that Petro-Canada, with a 30-per-cent interest in the Venture development, is not getting its fair share of management decision-making in its partnership with Mobil, which has a 60-per-cent interest.

Mobil provides Petro-Canada with information and Petro-Canada attended the last meeting of the partners six weeks ago, Mason said.

Told that Stanford claimed he wasn't getting enough information and at the right time, Mason simply said: "I have no comment."

Stanford, standing virtually beside him, was asked about the matter.

"No comment," he replied.

E.T.

Jan. 28/83

P. 18

BP shareholders vote to accept Petrocan offer

By PAUL TAYLOR

The shareholders of BP Canada Inc. of Toronto have thrown their support behind the proposed sale of the company's gasoline stations and refining operations to Petro Canada.

At a special meeting in Toronto, shareholders voted 99 per cent in favor of the \$347.5-million deal that was worked out last September by BP Canada, its British-based parent

and Petrocan.

The approval of the courts and other arrangements must still be settled before the sale can proceed. But BP Canada's management does not expect any problems. "It's virtually assured that it will go through," said company president R. W. Hanbidge.

Under the deal, BP Canada will be split into two new companies on Feb. 28. One will be made up of the

marketing and refining operations and the other will retain the oil, gas and mineral assets.

Shareholders will receive shares of both companies plus a special dividend. The shares will start trading on the Montreal, Toronto and Vancouver stock exchanges on March 1. A few weeks later, Petrocan will begin to take up the shares of the BP Canada marketing and refining company.

BP Canada shareholders can expect to get about \$24.44 in cash for each of the existing BP Canada shares. As well, they will receive one common share of the new BP resource company, which will remain active in oil and gas exploration and mineral development in Canada.

Mr. Hanbidge said the sale of the marketing and refining assets is in the best interests of the company and its

MARKET PERSPECTIVE

shareholders, basically because the business outlook in this area is so bad.

"We are not encouraged by the prospects in . . . the refining and marketing sector of the oil business," he said. "Demand in our marketing area (Ontario and Quebec) has declined by over 23 per cent since 1979, with gasoline demand falling by 16 per cent over the same period."

As a result of energy conservation and the recession, industries and consumers have dramatically reduced their consumption of petroleum products such as heating oil and gasoline. Many industry officials expect that business could get worse before it gets better.

"We see this decline in demand continuing into the second half of the decade," Mr. Hanbidge told shareholders.

But despite the slump in this sector, many observers believe that Petrocan

could benefit by taking over the BP service stations. In particular, the federal oil company, by appealing to the nationalistic sentiments of many Canadian consumers, could grab market share away from the foreign-owned oil companies.

Corner Brook good for oil platforms

CORNER BROOK (Staff)— Officials of the Petroleum Directorate say production platforms for offshore oil could be produced here and construction would employ about 2,500 people.

Mayor George Hutchings said when over 30 sites were designated for offshore activity a few years ago, Corner Brook ranked high on the list for construction of steel and concrete platforms, module fabrications and as a site for supply and services.

The city, he said, has a

good infrastructure and a deep water port.

The city is anxious for an offshore agreement to be signed between the provincial and federal governments because it would provide a tremendous economic boost to the city, particularly in the wake of massive Bowater layoffs this spring.

However, now that the offshore talks have broken off, there is concern that boost could be a long time in coming.

D.N

Jan. 29/83

P. 5

New search-and-rescue satellite official soon

TRENTON, Ont. (CP) — Canada's new search-and-rescue satellite, which has been saving lives since last September, goes into official operation next week.

The satellite, which relays distress signals to this Canadian Forces base 20 kilometres southwest of Belleville, circles the Earth every 104 minutes and eventually will be joined by four from other countries to provide combined safety surveillance on a 24-hour basis.

Defence Minister Gilles Lamontagne and Communications Minister Francis Fox visited the Trenton facilities Wednesday along with Maj.-Gen. Paul Manson, chairman of the federal interdepartmental committee in charge of

search and rescue.

Since September, 12 people across Canada and the U.S. have been rescued after the satellite picked up their emergency locator transmitter signal, officials said. When the satellite detects a signal, it relays the information to a ground-station computer, which can track the signal to within 20 kilometres.

Manson said once the information reaches the Trenton centre, the base alerts the nearest search-and-rescue organization for follow-up.

In one case, a plane crashed 145 kilometres off course in the British Columbia interior and the aerial of the plane's emergency locator transmitter was broken.

D. N.

Jan. 29/83

P. 54

Petro-Canada passes another hurdle in BP takeover

TORONTO (CP) — Petro-Canada, the federally-owned oil company, passed another hurdle in its \$350-million takeover of the marketing and refining businesses of BP Canada Inc., when minority shareholders of the foreign-controlled oil giant gave their blessing to the deal Friday.

The deal, in which BP must split itself in two, now goes to the Ontario Supreme Court next month for approval of Friday's resolution before final documents can be signed under

the Canada Corporations Act.

Under the arrangement, Petro-Canada would take over 1,640 BP service stations in Ontario and Quebec and BP's refinery in Oakville, near Toronto. BP would split into a exploration and production company, BP Resources Canada Ltd., and a marketing and refining company, BP Refining and Marketing Canada Ltd.

BP would continue to operate the resource company while Petro-Canada would take over

the marketing and refining arm.

In the creation of the two concerns, BP Canada common share shareholders get three Class A shares and one Class B share of BP Refining and Marketing and one common share of BP Resources.

A CRUCIAL STEP

As the crucial part of the deal, Petro-Canada has promised to buy all shares of BP Refining and Marketing at \$16.10 a share as the equivalent to each existing BP Canada

common share.

If for any reason, Petro-Canada doesn't take up all BP Refining and Marketing shares, the entire deal is off under a backout clause in the sale agreement, R. W. D. Hanbidge, BP Canada president, told a special shareholders meeting.

But he stressed at the meeting and at a news conference later, nothing could go wrong. A Petro-Canada spokesman also said later nothing would prevent the Crown corporation from taking up the shares.

In addition, from the proceeds of liquidation of its inventory of crude oil and petroleum products not being assumed by the seller, BP Canada will declare a special dividend of \$8.34 a share.

The end result of the complicated deal is that shareholders of BP Canada stand to receive \$24.44 a share, while still retaining a stake in the resources company, Hanbidge added.

BRITISH CONTROLLED

BP Canada is 64-per-cent owned by British Petroleum Co. PLC.

BP officials said shareholders voted more than 99 per cent in favor of the deal either through proxies or ballots cast at the special meeting. In all 18.42 million shares were voted in favor with 7,130 against.

Several favorable tax rulings were also essential to the deal going ahead, but the decisions from Revenue Canada have been received, Hanbidge said.

But just in case there are any complications with the Ontario Supreme Court's ruling, the special shareholders meeting was set to reconvene Feb. 13 at

BP's Toronto headquarters.

Hanbidge told the shareholders, BP Canada was not encouraged by the outlook for the oil refining and marketing business, because of declining demand and difficulty in expanding by acquisition because of foreign investment regulations.

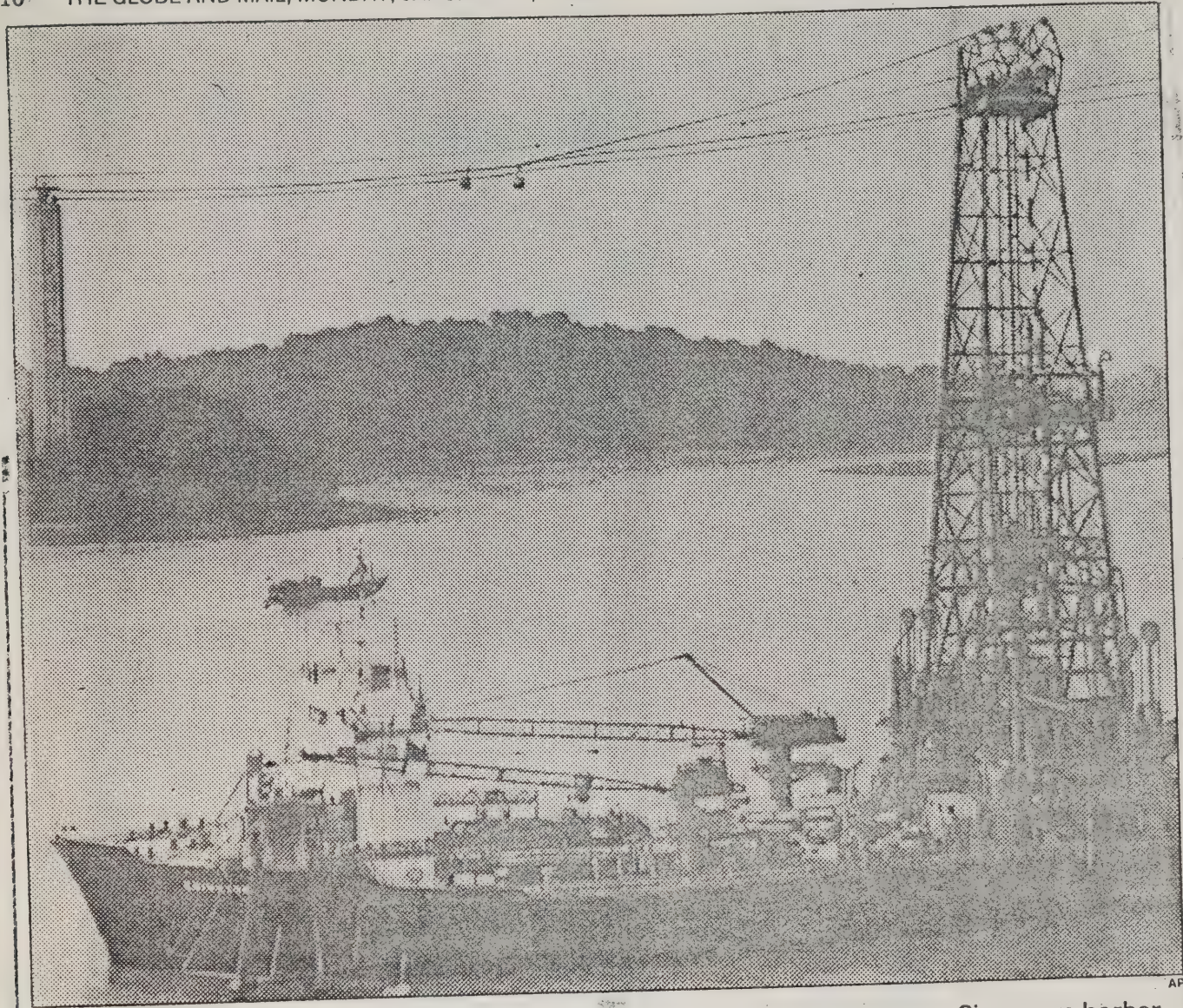
He told reporters later the executive offices of BP would be moved to Calgary, likely in April.

Of BP's 4,000 employees, 3,500 are to be shifted to Petro-Canada, said BP chairman Roy Bennett.

E.T.

Jan. 29/83

P. 5



Oil rig mounted on ship is entangled with steel cables carrying cable cars over Singapore harbor.

7 die, 13 saved in cable-car fall

From Reuter and Associated Press

SINGAPORE — Army helicopters flying in darkness and high winds yesterday winched 13 people to safety from cable cars left dangling 200 feet above the sea after an accident that killed seven people.

Two Americans, two Australians and three Malaysians died when two of the cars plunged into the sea after an oil rig mounted on a ship hit the steel cables of the one-mile overhead system that links Singapore with the resort island of Sentosa.

No Canadians were among those killed, but an unidentified Canadian was reported to be among the 13 rescued.

Ng Chor Meng, 25, watched the accident happen as the ship plowed into the cable Saturday night. "We all screamed and screamed," he said, as the seaborne rig, nudged along by tugs,

vibration."

Another witness said he heard screams from terrified passengers before the two cable cars crashed into the water.

Yesterday's helicopter rescue was approved only after a six-hour assessment of the risks, police said. The last tourists lifted to safety had sat in the crippled cars for more than 10 hours.

Police said 13 people were rescued from five cars. Earlier police reports had put the number at 14.

The only survivor from the two cars which fell into the sea was a three-year-old Malaysian Sikh boy who was thrown clear and picked up from the water. He was in hospital with severe head injuries and was reported to be in critical condition.

"The two helicopters involved in the rescue had to approach very carefully because the downward wind caused by

their rotor blades kept swaying the cabins," a police spokesman said.

The search for more bodies in the busy sea lane was called off yesterday. Police said they believed navy frogmen had found all the bodies, though they added that no count had been kept of passengers boarding the cars.

Singapore authorities kept back an estimated 10,000 spectators as they mounted a massive rescue operation involving 5,000 soldiers, policemen, firemen, port workers and frogmen.

Two army helicopters aimed powerful beams of light on the hanging cable cars in the early-morning darkness as rescue workers in other helicopters brought the stranded passengers to safety one by one.

The Singapore Government has ordered an inquiry into the accident, the first involving the nine-year-old cableway.

Satellite station to close

SHOE COVE (Staff)—The satellite station here is being eliminated by the federal government and Gordon Pike, the operations manager of the station, is none too pleased with that decision.

Mr. Pike says the station has the potential to provide very important weather forecasting and ice movement predictions to offshore companies and that the station is considered a valuable tool to most of the East Coast of Newfoundland.

When the satellite station is eliminated at Shoe Cove, the offshore companies will be forced to obtain their weather information and ice movement predictions from American satellites.

Mr. Pike says that won't help the people offshore too much because the information will be delayed and therefore put the people concerned offshore at a disadvantage.

Another data receiving station will be affected by the federal government's decision to cut back on its tracking stations.

A station in Prince Albert, Sask., will no longer receive weather information on its satellite. Instead the station will only record weather information received from one single satellite station in Churchill, Man.

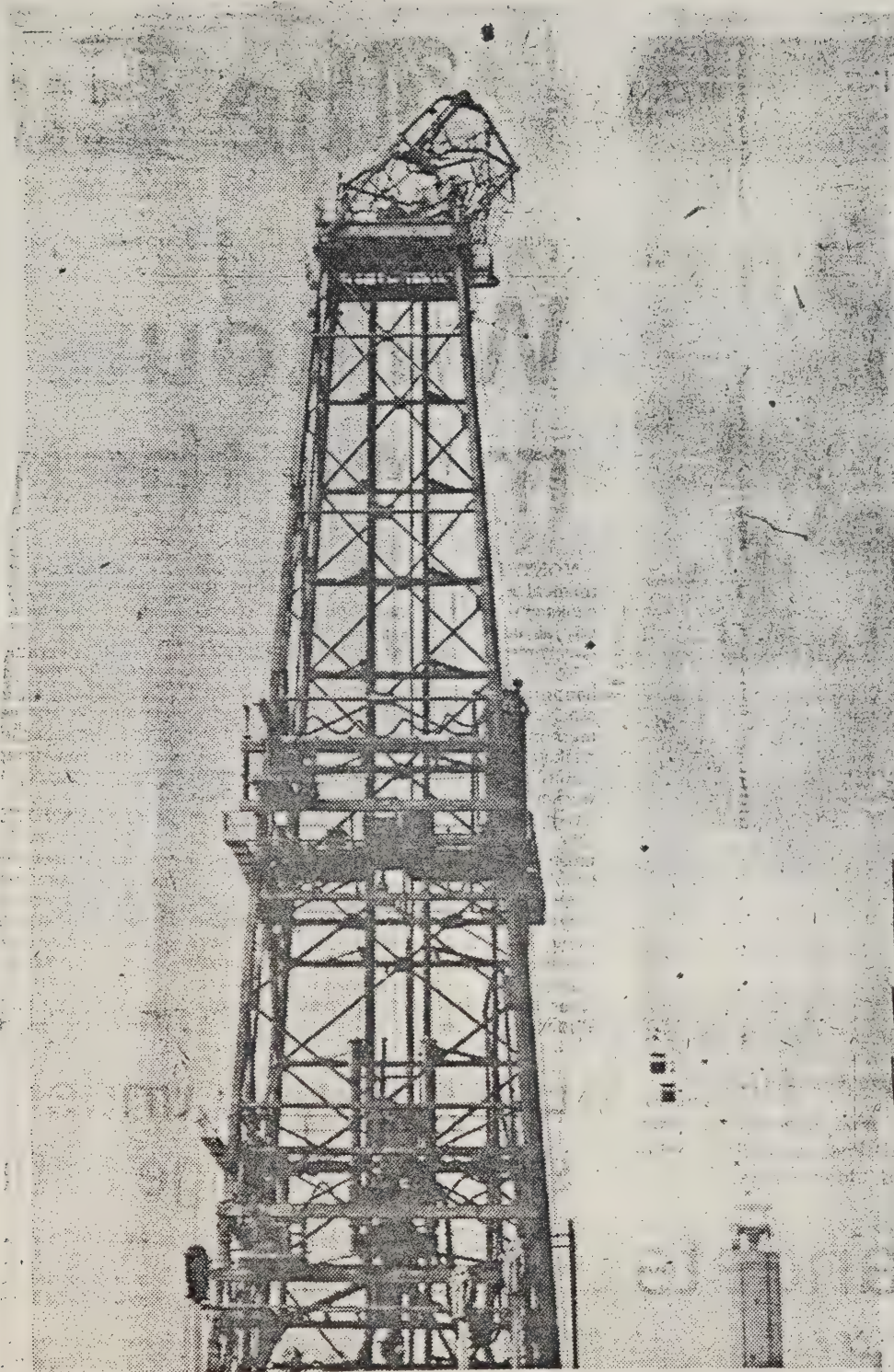
The satellite station in Churchill isn't constructed yet, but, when it is, it will be expected to pick up weather conditions for all of Canada.

Mr. Pike says the station in Manitoba will be geographically in the center of Canada, but that its capacity to accurately see the East Coast of Newfoundland and the North Atlantic may be limited.

D. N.

Jan. 31/83

P. 5



AP Photo

The crumpled top of the oil drilling rig "Eniwetok" stands entangled with cables supporting a cable car ride across Singapore harbor Sunday. Seven tourists died Saturday when the rig struck the cables and 13 others were trapped in cable cars 33 metres in the air.

E.T

Jan. 31/83

P. 2

(1 of 2)

Oil rig snags cable; seven plunge to death

SINGAPORE (AP) — Salvage workers with blowtorches cut the top off a ship's oil-drilling rig Sunday, freeing a cable-car line after a drama that sent seven people plunging to their deaths and left 13 dangling in darkness for hours.

Dorothy Jean Gilliland, 32, of Redondo Beach, Calif., one of the 13 plucked to safety by helicopters high over Singapore harbor, said the 10-hour ordeal was "like out of the movies." Two other Americans were among the dead.

"All you have to do is sit and wait," Gilliland said in a report broadcast by Satellite News

Channel of Stamford, Conn. "Then we were rescued.... A helicopter with a sling came down and carried us up."

No Canadians were among those killed, but an unidentified Canadian was reported among the 13 rescued.

Ng Chor Meng, 25, watched the accident unfold as the ship plowed into the cable Saturday night. "We all screamed and screamed," he said, as the seaborne rig, nudged along by tugs, got tangled in the cable with a "terrible vibration."

Another witness said he heard screams from terrified passengers before two of the

cable cars crashed into the water. Three other cable cars remained suspended.

Two army helicopters aimed powerful beams of light on the hanging cable cars in the morning darkness as rescue workers in other helicopters brought the 13 stranded passengers to safety one by one.

Police said the accident occurred about 6 p.m. Saturday when the Panamanian-registered oil drilling ship Eniwetok struck the overhead cables stretching more than 300 metres between the main island of Singapore and the popular tourist island of Sentosa.

E.T.

Jan. 31/83

P. 2

(2 of 2)

Manager says facility a necessity

Closing satellite station backward step for Canada

By RUTH EDGETT

Of The Evening Telegram

Last week, if you had asked, Gordon Pike may have been able to provide a satellite image that can predict the migration of northern cod or one that will help determine how much of Newfoundland washes into the sea each year.

Today all he can show is sophisticated equipment at Shoe Cove ready for dismantling, and give a shrug of his shoulders when asked what he'll do when his position as operations manager terminates March 31.

Monday was the last day the Shoe Cove satellite receiving station provided a service to its international list of customers. Today, the 11 employees at the station, near Pouch Cove, begin taking apart the equipment and packing it for shipment to Ottawa and Prince Albert, Sask.

"It's a giant step backwards for technology here in eastern Canada," said Pike.

Canada "desperately" needs the Shoe Cove station and its capability to provide immediate information on almost anything scientists want to know about the geology or oceanography of the western part of the north Atlantic and the eastern Arctic, he said.

Even though Pike's feelings are shared by premiers in all the eastern provinces he appeared doubtful a last-ditch attempt Monday by Development Minister Neil Windsor to have the federal government reconsider the closure decision would have any effect.

The Shoe Cove station will close as part of a move to save money by centralizing satellite receiving facilities in a new station at Churchill, Man. A second existing station, which serves Western Canada from Prince Albert, will remain in operation as a data processing centre for Churchill.

Shoe Cove was the site of a space flight tracking station for the National Aeronautics and Space Administration (NASA) until 1975. In 1977 the Canadian Centre for Remote Sensing of the Department of Energy, Mines and Resources, set up the satellite receiving station in Shoe Cove. But an increase in charges by the U.S. for use of its satellites has caused the federal government to look for ways to cut costs.

"We were just getting off the ground," Pike said. Despite several initial problems associated with new technology, the wrinkles were smoothed out and the Shoe Cove station had begun to show its potential, said Pike.

In the last two years the centre has been able to provide a "marketable product," and offshore oil and gas developers were just beginning to appreciate how valuable the station could be for immediate information on weather, currents and ice floes.

The Shoe Cove station provided customers from around the world with meteorological data for weather forecasts; oceanographic information, such as locations of plankton that would dictate fish migrations; water temperature profiles; sea state and ice conditions; and geographical information that, among other things, could help scientists determine how fast the province's coast line is eroding and images for archives that would show the shape of the coast before it washes away.

Customers were as far away as Norway, France, Japan, England, Florida and California, said Pike. He said many U.S. customers bypassed their own satellite stations operated by NASA in favor of Shoe Cove, because they could get the in-

formation faster.

With Shoe Cove closed the only satellite information on the areas east of Sable Island will have to come from NASA in the United States, and it will take weeks to get it, said Pike. Information for analysis must be recorded on special computer tapes which, in turn, must be shipped to the customer, he said. The station in Churchill won't be able to cover the easternmost areas.

Often customers don't know what images they want to analyze until after they see them, said Pike. A further difficulty with the loss of the Shoe Cove station is that customers will almost have to know what images they want before they ask for them, he said.

"A satellite is like a light bulb...you have to turn it on and off," explained Pike.

"Now, NASA isn't going to turn on the satellite unless you tell them to. You just can't pick up the phone, call NASA and say: 'Can you turn it on today, please.'"

Pike said the centralizing of satellite receiving in Manitoba will provide almost complete coverage of Canada and parts of the United States — except for the eastern Arctic, easternmost parts of Newfoundland, the offshore fishing grounds

and areas subject to oil and gas exploration.

Windsor said earlier he has attempted to impress upon federal Energy Minister Jean Chretien the importance of Shoe Cove. With increased offshore development the station may actually do better with expansion than closure, he said.

Pike agreed the station could provide crucial services to offshore developers who could look nowhere else for immediate information on iceberg approaches. He speculated Monday that if the federal and provincial governments had reached an agreement on offshore development in their latest round of talks there may have been a reversal of the closure decision.

The Centre for Cold Ocean Resources Engineering (C-CORE) at Memorial University is one of the provincial agencies that has made use of the satellite information from Shoe Cove in its analyses of iceberg behavior.

But C-CORE director Harold Snyder said Monday the offshoot of the MUN engineering department won't suffer with the station's loss even though the satellite images complemented the engineering work.

And he said the station had its limitations since much of its in-

formation was obtained from the LANDSAT satellites which can't "see" through cloud cover.

Despite that the station provided a useful service to the scientific community, said Snyder. And he said he would have liked to see the station developed to its full potential as a Northwest Atlantic monitoring centre providing specific weather information to fishing fleets, transportation operations and offshore oil and gas developments.

The station will close because the U.S. upped its annual fee for satellite use in Shoe Cove's case from to \$600,000 from \$50,000. In addition, a new royalty charge was affixed for each frame or image from the satellites.

Snyder said he doesn't know who to blame for the demise of a potentially valuable station; the Canadian government for not bothering to protest the price increase, or the U.S. government for not recognizing the value of the station to Americans.

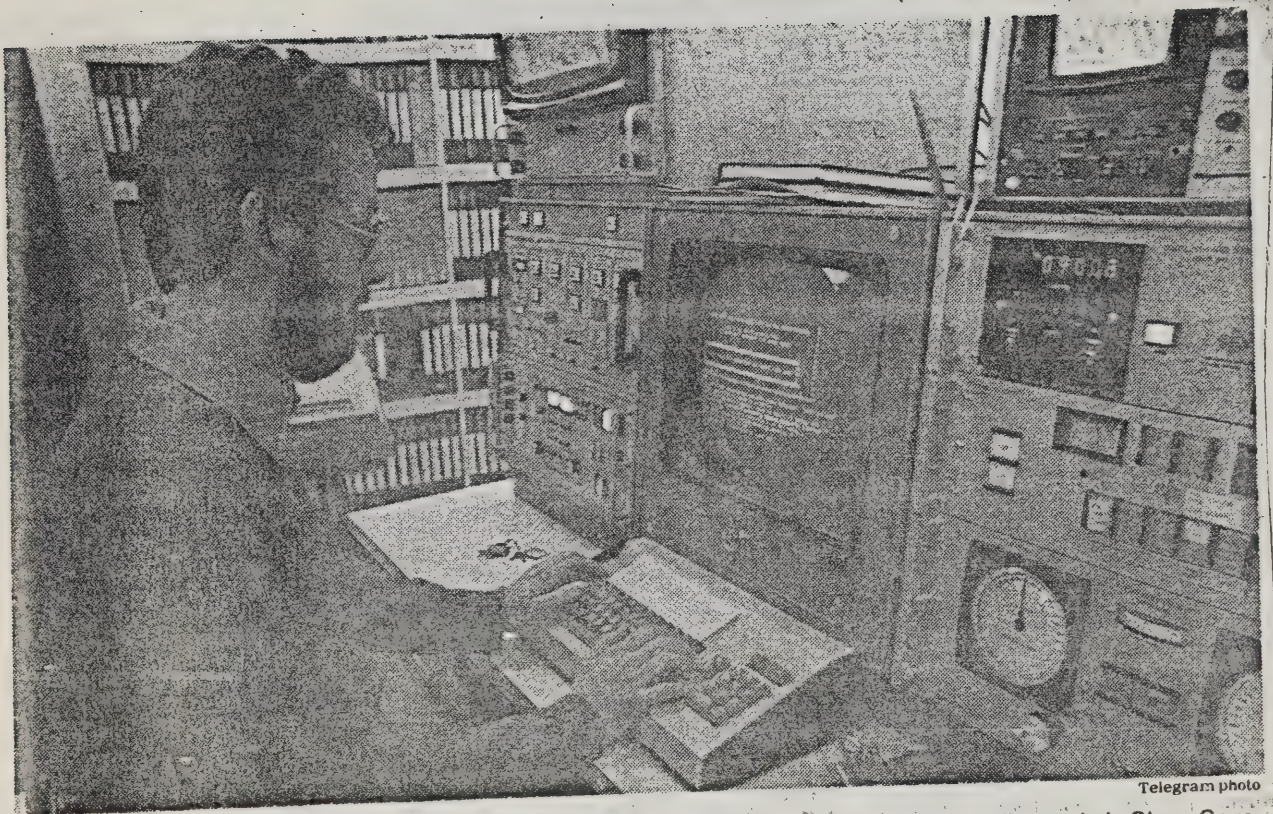
Meanwhile, Pike acknowledged he is somewhat bitter about the closure. Although the 11 technicians, engineers and security personnel have been told they will be given other jobs, no firm offers have yet been made, he said.

E.T.

Feb. 1/83

P.3

(1 of 3)



Telegram photo

Technician Paul Moakler demonstrates some of the computerized equipment at the Shoe Cove satellite receiving station that will be shipped to other parts of

the country as the station is dismantled. Shoe Cove, about 21 km outside St. John's, served its last customers Monday.

(2 of 3)



Telegram photo

The rotating dish at the Shoe Cove satellite receiving station pointed skyward Monday as employees inside the adjoining building began to prepare for dismantling of the station's equipment. Shoe Cove will shut down as part of a federal government move to centralize its satellite receiving facilities in Churchill, Manitoba.

Inquiry set to restart

The Royal Commission inquiry into the Ocean Ranger marine disaster will resume Tuesday, March 8.

The inquiry is investigating the sinking of the oil rig last Feb. 15, which claimed the lives of 84 crew members, 53 of them Newfoundlanders.

D.N.

Feb. 2/83

P.3

Windsor wants Shoe Cove satellite station to stay

Provincial Development Minister Neil Windsor has asked federal Mines and Energy Minister Jean Chretien to reverse his decision to close the Shoe Cove satellite receiving station until a public hearing is held to study the long-term ramifications the closure will have with respect to safety in offshore activities and technology development in Newfoundland.

In a telex to Mr. Chretien Tuesday, Mr. Windsor called for a public hearing on the issue.

The station is crucial to the safe development of offshore resources, Mr. Windsor said later at a press conference, and forms a basis for technology development in Newfoundland, particularly in the area of remote sensing technology.

"Newfoundland is being very seriously discriminated against," Mr. Windsor said.



NEIL WINDSOR

He thinks the federal government made the decision to close the station on a "dollar and cent basis" and did not properly assess how the closure would affect the province.

Until now, the federal government leased the station, owned by the United States government, for \$50,000 a year. This year, however, the American

government is asking \$600,000 a year, bringing the total operating cost of the station to about \$1.2 million per year.

The federal government decided to close the Shoe Cove station and another American-owned one in Manitoba because of the increased cost.

A federal-owned satellite receiving station is scheduled to open in Churchill, Man. However, its signals do not reach east beyond the Avalon Peninsula.

This has serious implications for the scientific, fishing and forestry communities, Mr. Windsor said, and will particularly affect offshore operations on the East Coast because that area will not receive the weather and ice flow information it needs for safe operation.

He noted that, while Newfoundland can receive that information from a satellite in the United States,

it would take weeks for the information to get here. "By the time we receive it, it will be history."

Mr. Chretien, he said, "is totally insensitive to Newfoundland's needs."

He views the decision to close the station as a form of discrimination against the province, but that Mr. Chretien "wasn't concerned we're being treated differently" when he spoke to him by telephone earlier Tuesday.

Oil companies have indicated they would help pay the operating costs of the station if it were to be kept open. It's unlikely, however, that the provincial government would take over complete operation of the station.

As Mr. Windsor sees it, "The provincial government should not use taxpayers' money to provide service being provided by the federal government in other parts of the country."

D.N.

Feb. 2/83

P.4

Windsor seeks public hearing on satellite station closure

Development Minister Neil Windsor has called upon the federal government to delay the closure of the Shoe Cove satellite receiving station until a public hearing is held to examine the implications of the shutdown.

The station, operated by the Canadian Centre for Remote Sensing, served its last customers Monday and is scheduled to be completely dismantled by March 31.

Windsor said in a news conference Tuesday his eleventh hour appeals to Federal Energy Minister Jean Chretien went virtually unheeded earlier in the day.

The minister said he was "quite disturbed" by Chretien's attitude toward the station during telephone conversation. Windsor said the federal minister admitted the Shoe Cove service was a unique one, and that a new centralized station in Churchill, Manitoba, won't cover Newfoundland's offshore. However, Windsor said, those facts didn't appear to move the federal minister from his decision to close down the station.

The federal government has elected to centralize its satellite receiving facilities at a new station in Churchill. A second existing satellite station in Prince Albert, Saskatchewan, will remain in operation as a data processing centre but Shoe Cove will be vacated.

The centralization follows a

move by the United States government to raise its annual fee for use of its satellites. In Shoe Cove's case the cost went up more than 10 times to \$600,000 a year.

Windsor said he didn't specifically ask the federal minister for a delay pending a public hearing when he spoke to him Tuesday. He said he did ask for a delay of the closure, but the minister "was not at all receptive to that."

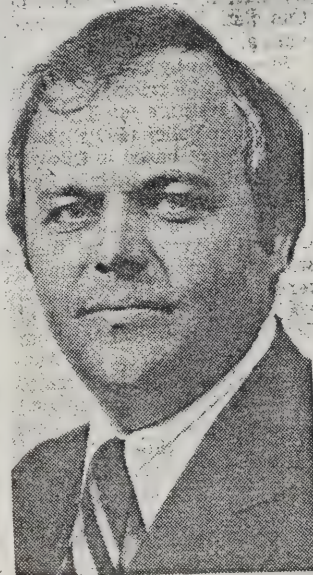
Windsor said a public hearing should be held to reveal the actual implications of the Shoe Cove closure. The station was capable of providing oceanographic and geological data as well as providing a vital iceberg detection service for offshore developers.

The provincial minister said Chretien should be open to a public hearing if he believes he has made the right decision.

But Windsor admitted there probably isn't much hope for the future of the Shoe Cove station, which is located 21 kilometres outside St. John's.

The federal government doesn't appear willing to budge in its position, and the provincial government has neither the money nor the inclination to spend taxpayers' money on an operation that is the responsibility of the federal government, he said.

"I guess all is lost, but I think it's important to point to the people the implications of this



NEIL WINDSOR

decision by the federal government," said Windsor. "I don't think it's been properly assessed."

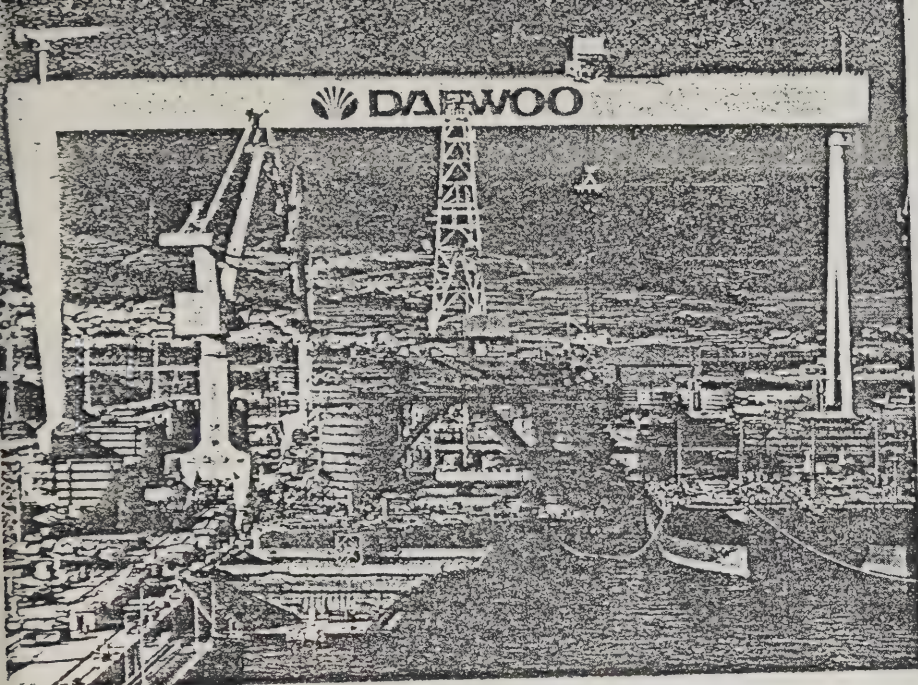
He said Chretien's attitude toward the station is symptomatic of relations between Newfoundland and the federal government. The move to close the Shoe Cove station is another discriminatory move against Newfoundland, he said.

Windsor noted many other technological developments occurring in the province, such as the construction of a new marine vessel research facility at Memorial University. In a period when high technology receives so much emphasis the closing of the satellite station on the eastern most tip of North America doesn't make sense, he said.

E.T.

Feb. 2, 1983

P. 3



Aerial view of Daewoo Shipyard showing new Reading and Bates rigs under construction.

Two New Reading And Bates Rigs Are Christened At Daewoo Okpo Shipyard

In an impressive double ceremony, two Reading and Bates semisubmersible drilling units were christened recently by Daewoo Shipbuilding and Heavy Machinery Ltd. of Korea.

The basic design of the "Jim Cunningham" and the "M.G. Hulme, Jr.", is the L-907 enhanced pacesetter type licensed by Friede & Goldman of the U.S. Production engineering and fabrication drawings were developed by Daewoo.

Among the dignitaries attending the double christening were J.W. Bates Jr., chairman of the Reading and Bates Group, C.E. Thornton, president of Reading and Bates Corp., J.E. Cunningham, chairman of the McDermott Group, M.G. Hulme Jr., president of Mine Safety Appliances Company, and W.D. Kent, president of Reading and Bates Drilling Company.

Korean dignitaries in attendance included Kyung Sik Kang,

the minister of finance, Woo Choong Kim, the chairman of the Daewoo Group, and In Kic Hong, the president of Daewoo Shipbuilding and Heavy Machinery Ltd.

These L-907-type rigs are 270 feet in length, having a 200-foot beam, and are 340 feet high keel to derrick. This is one of the more popular designs throughout the industry, and has a reputation for economy.

The major difference between the two rigs is that the Cunningham is primarily designed to drill in 1,500-foot water depths, while the Hulme, Jr. is primarily designed to drill in 2,500-foot water depths.

In addition, there are other differences. The Hulme accommodates 104 persons; has surface and subsurface pendant buoys, and pendant line assemblies for 2,500-foot water depth; 2,500 feet of 21-inch riser assembly; an 18-3/4-inch, 15,000-psi single-stack BOP system for H₂S service which includes two 18-3/4-inch Cameron double type "U" ram preventers, 15,000-psi WP with four 15,000-psi WP outlets, and 18-3/4-inch Cameron-type D annular BOPs, 10,000 psi.

The Cunningham houses 88 persons, has buoys designed for 1,500-foot water depths, has 1,500 feet of 21-inch riser assembly, has 18-3/4-inch 10,000-psi single stack BOP system which includes 18-3/4-inch Rucker-Shaffer spherical BOPs, 5,000 psi, and two 18-3/4-inch Cameron double type "U" ram preventers, 10,000 psi WP, with four 10,000 psi WP outlets.

Both rigs have a unique mooring system which offers several distinct advantages.

The mooring winches are installed within the pontoons. This location not only protects the winches from the elements, but

JIM CUNNINGHAM And M.G. HULME, JR.

Specifications

Length overall	295'
Width overall	228'
Main deck length	216'
Main deck width	202'
Depth to main deck	116'
Column diameter-corner	35'
Column diameter-midship	32'
Pontoon height	25'
Pontoon beam	50'
Normal operating draft	65'
Severe storm draft	50'
Transit draft	23'

Light ship displacement 12,000 L.T.
Estimated moving speed . . . 9.5 knots
(Propulsion Assist + 7,500 bhp tug)

Storage

Water:	drilling	14,500 bbls
	potable	3,000 bbls
	ballast	73,800 bbls
Mud:	liquid	1,500 bbls
	bulk	14,260 cu. ft.
Cement:	bulk	6,440 cu. ft.
Sack Storage		8,000 cu. ft.
Fuel		14,800 bbls

Major Suppliers

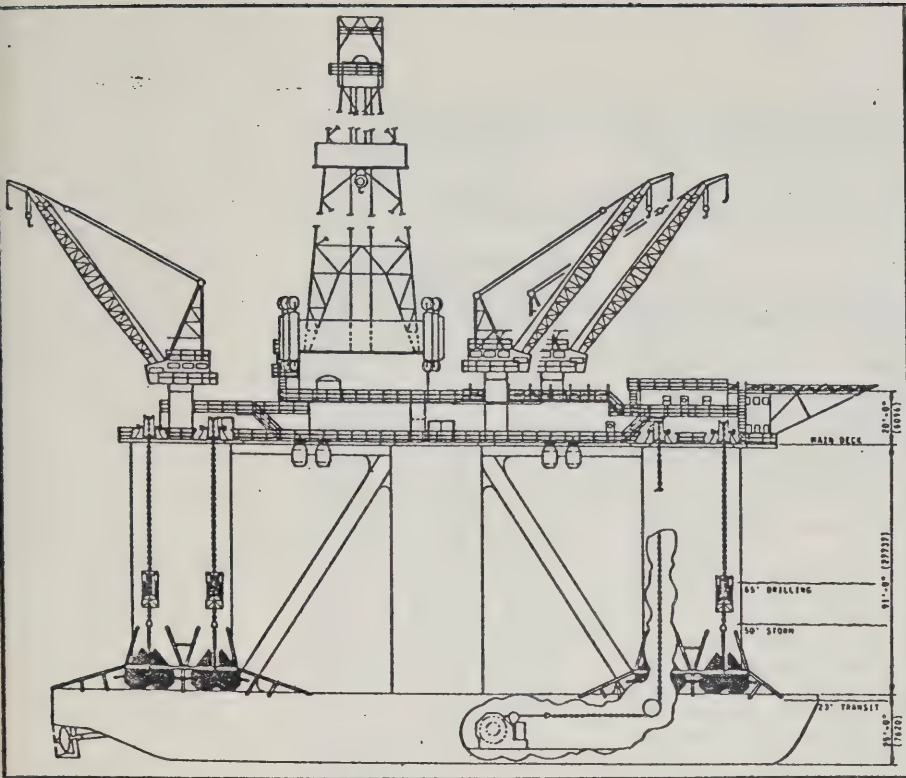
Cranes	Skagit and National
Mooring windlasses	Skagit
Propulsion assist	General Electric
Prime movers	EMD
Position reference	Honeywell
Mud pumps	National
Drawworks	National
Energy generators	Caterpillar
Derricks	Continental EMSCO and DRECO
Crown blocks	Branham and Continental EMSCO
Traveling blocks	National
Hooks	National
Swivels	National
Rotaries	National
Motion compensators	Vetco
Drift indicators	Totco
Diverter system	Regan
Iron roughneck	Varco
BOP control system	NL-Koomey
Ram preventers	Cameron
Spherical BOPs	Rucker-Shaffer
Annular BOPs	Cameron
Riser Tensioners	Vetco

MARITIME Reporter

Dec. 1/82

P. 10-12

(1 of 2)



Drawing shows unique placement of mooring winches in the pontoons.

results in a much lower center of gravity. The variable deck-load capacity during drilling operations is increased from 20 to 60 percent and more than doubles during transit due primarily to the unique mooring system design.

Another key feature is the use of a very heavy chain between the end of the wire-rope mooring line and the anchor. This heavy chain provides elasticity in the mooring line catenary in shallow depths and limits the length of wire rope required to achieve maximum anchor-holding power in deeper water. Because the use of wire rope reduces the weight of the line, the vertical component at the fairlead is also reduced, leaving the greatest percentage of line strength available for developing the horizontal force required to hold the rig on station.

The rigs are designed to operate worldwide and withstand -20°C temperatures, 100-knot winds and 30-meter wave heights. They are self-propelled with a speed of 8 knots and capable of drilling to 7,600 meters in water depths of 450 meters.

A library, theater, recreation room, hospital, two mess rooms and an elevator are provided and both rigs are fully air-conditioned.

There are twenty-one L-907 units currently under construction throughout the world and Daewoo is building seven of these. Korea Drilling Company, established recently to develop Korea's offshore oil resources, has placed an order for one L-907 with Daewoo Okpo.

The huge size of Okpo's graving dock — 530 meters long, 131 meters wide, and 14.5 meters deep — permits the yard to construct many vessels simultane-

Two New Reading & Bates Rigs Christened At Daewoo

(continued from page 10)

ously. In June of this year, six vessels including the two new rigs, were launched simultaneously. In September of this year, five additional units were again launched simultaneously: a semi-submersible rig, a jackup rig and three vessels. This exceptional

performance is a direct result of both the size of the huge dock and state-of-the-art construction technology throughout the entire yard.

Other vessels delivered or under construction at the Okpo yard include four 22,500-dwt chemical tankers, a 128,000-dwt shuttle tanker, two 17,500-dwt product carriers, one 140,000-dwt bulk carrier, five semisubmersible drilling rigs, two jackup drilling rigs and a seawater treatment plant. The sum total of exports by Daewoo Shipbuilding and Heavy Machinery Ltd. as of October 1982 is U.S. \$466 million.

The total area of the yard is 3,170,000 m² (shops — 147,393 m²). The Goliath Crane is 900 tons with a 205.7-meter span. The yard's capacity includes: 300,000 tons of steel fabrication per year, 1.2 million gt of shipbuilding per year, 684,000 gt of ship repair per year. Maximum vessel size is one million dwt.

Reading and Bates is recognized as one of the world's leading offshore drilling contractors and has been in the forefront of many offshore operations in over 50 countries around the world. With the addition of the Cunningham and the Hulme, the company's drilling fleet will total 31 rigs.

(p 2 of 2)

Legislators to attend seminar on offshore oil development

TEL
THIS
WEEK

A seminar on various aspects of offshore oil and gas development will be held in St. John's next week for a small group of legislators from the House of Commons and several provinces.

Sponsored by the Centre for Legislative Exchange (CLE) and the Institute for Research and Public Policy (IRPP), both of which are based in Ottawa, the seminar will be held Feb. 7-10 at Hotel Newfoundland.

D.C. Roland, director of the CLE, said Tuesday that there will be around 16 legislators attending the seminar, with up to six coming from the House of Commons, and one or two from each of Newfoundland, New Brunswick, British Columbia, Manitoba, Nova Scotia and Saskatchewan.

Jim Russell, Speaker of the Newfoundland Legislature, said this province will be represented at the seminar by Opposition leader Steve Neary (L-LaPelle) and Fred Stagg (PC-Stephenville).

The CLE has participated in sponsoring seminars on various topics on a regular basis but this is the first to be held in Newfoundland.

The last one was on the east coast fishery and was held in Halifax in early December, 1982.

Roland told The Evening Telegram Tuesday, that the seminar, organized by he and Don Wilson of the IRPP, is aimed at providing an extensive look at the potential for offshore oil and gas in Canada, with particular focus on the east coast.

He said there will be 14 sessions during the seminar, on such topics as a general overview of Canada's offshore oil and gas resources, a close look at the geology and potential of Hibernia, the offshore dispute between Newfoundland and Ottawa, industrial and government relations in the development of the offshore; management issues involved in the offshore, the economics of potential development in Newfoundland, a look at the Sable Island situation, research and technology associated with the

offshore; the technology of oil rigs and life on a rig; and some assessment of what the impact on St. John's of development of Hibernia might be.

Roland said he was unable to release the list of seminar speakers but it will include senior officials of the federal and provincial governments, representatives of the major oil companies involved in east coast offshore activity, senior officials of the Government of Nova Scotia and officials of the Centre for Cold Ocean Research Engineering (CCORE) at Memorial University.

Seminar sessions will include dinners scheduled for Monday and Tuesday nights, said Roland.

All seminar sessions are closed to the public.

Seminar delegates will be tendered a reception at Government House by Lieutenant-Governor W. Anthony Paddon at 5:30 p.m., Feb. 9.

E.T

Jan. 30/83

THIS MONTH

Concrete plugs to the rescue as Rankin's piles plunge deeper

The merry saga of foundation pile driving for Australia's Rankin A platform is reaching its end. In the last month the final main platform pile has reached the desired penetration of 120m.

The embarrassing ease with which the 32 piles have been reaching that penetration has fuelled numerous rumours since driving started at Rankin in June. Stories have circulated that, to the horror of all concerned, the 154m long piles had been plunging to full penetration in the sea bed virtually unassisted by any hammering, because of a major over-estimate of predicted soil strength.

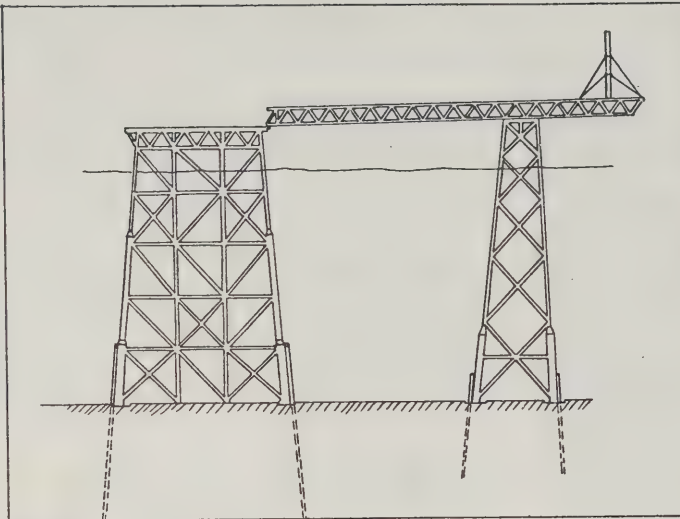
Such rumours have not been that far from the truth. To reach bottom, the piles have indeed needed very little application of the Menck MHU1700 underwater hammer being used by installation contractor Heerema. And the shortfall in skin friction along the pile shafts because they pass through weaker-than-predicted soil will have to be made up by calling a contingency plan into action.

While in the final analysis there is indeed 'no mystery, no problem' about Rankin's piles (as Woodside Petroleum's Mike Lodge told *OE's* Australian correspondent last month), that is only because the contingency plan will make it possible to overcome an inconvenience which everyone would have far preferred to avoid.

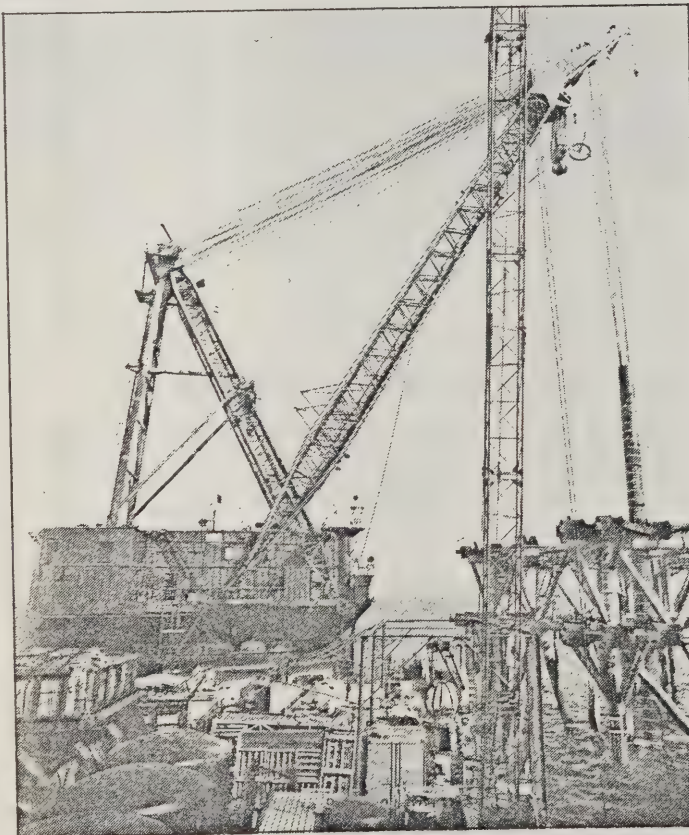
Soils consultant Fugro used the latest site investigation techniques, and the problems relate more to interpretation in calcareous soils which are notoriously hard to predict. It had always been known that the upper soil is weak, with the top 15m or more regarded as little better than butter. The foundation design relied on achieving the necessary 2,600t per pile working load capacity by skin friction in deeper layers, with some additional end bearing support provided by a harder layer of rock at a depth of around 110m.

Rankin's piles are 1.8m dia, and 154m long — achieved by welding two half lengths together at the platform. With a wall thickness of 50mm, each pile weighs 350t. At the start of installation, instead of free-falling around 20m into the soft upper seabed soils — already a significant distance, but at least expected — piles were dropping to penetrations of 60m under their own weight. As if this was not enough, in at least one case it took just a single tap of the hammer to send the pile to 110m — nearly wrecking the derrick of Heerema's crane barge in the process.

It was obvious that there was no chance of achieving the required bearing capacity



Concrete plugs in the ends of the main platform's 32 piles will now allow support primarily by pile end bearing, likewise in four of the flare tower's six shorter piles. The platform is in 125m of water.



Another Rankin pile ready to plunge.

with the original approach. The remedy has been to make the pile predominantly end-bearing rather than predominantly shaft-supported.

Concrete plugs are to be formed in the lower 15-20m of the piles' interiors, so that the full cross-sectional area of pile end can be mobilised as a source of support. As a contingency, grout beads were welded inside the piles at this point right from the

start, to provide a good bond between pile and plug.

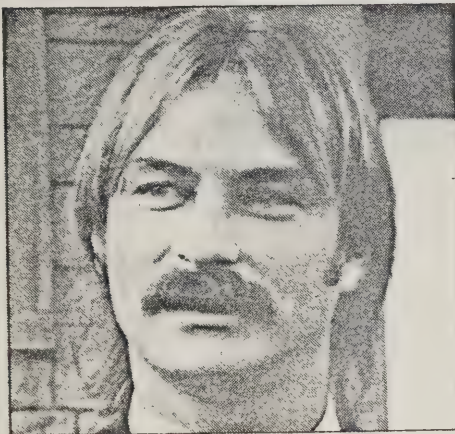
The piles have already been grouted, and placing of deck modules has started since the plugs can be set off the critical path. Starting in about two months, soil will be drilled out of the pile interiors and concrete tremied in. Four of the six piles on the flare tower will have to be plugged before the link bridge can be placed. *Adrian Cottrill*

THIS MONTH

Topside human error turns routine saturation dive into 'fraught' emergency

Diver Alan Beare's outstanding courage in rescuing two saturation divers off the Norwegian coast has been recognised with an award of merit presented by the Association of Offshore Diving Contractors (AODC) in late November.

The rescue took place on the Norwegian Valhall field in September last year but has only now been made public with Beare's employers, Comex Houlder Diving, deciding that his actions merited wider recognition.



Alan Beare — outstanding courage.

The accident was entirely the result of human error on the topside. An experienced diving tender accidentally replaced a heliox (helium plus 8% oxygen) cylinder with one containing pure helium.

The divers had been working in 80m of water out of a diving bell in a routine saturation operation. On breathing pure helium both divers lost consciousness too fast to switch on their emergency supplies. According to Comex's safety manual, death could have followed within three minutes. Bellman Alan Beare heard the unconscious divers panting over the intercom. 'At that moment things got a little fraught', he told *OE*.

Normal emergency procedures meant partly flooding the bell in order to help support the dead weight of the divers' bodies and to aid their circulation. Beare did this and then began to pull the first diver in by his umbilical. Unfortunately the diver had attached his diving line to his waist, rather than his neck. This meant that he could not be pulled through the narrow trunking into the bell.

Beare, who had his own separate breathing mixture supply, got into his diving gear, locked himself out of the bell and reached the first diver. He opened the bail out valve, re-attached the first diver's line correctly, and then winched him into the bell using the emergency Maasdam line puller. The first diver then went into

convulsions, indicating that he was still alive and did not need heart resuscitation. Beare lashed him to the wall of the bell, in order to clear the winch for the second diver.

Although this diver's line was properly attached, his umbilical had fouled and Beare was again unable to pull him into the bell directly. For a second time Beare locked himself out of the bell and swam out to free the umbilical.

The second diver was already regaining consciousness as Beare winched him in, while the other took two hours to recover. Both were screened and found to have suffered no permanent damage, and have subsequently returned to work in deep saturation for Comex.

The tape of the rescue is currently in Norwegian hands and neither Beare nor Comex's safety department have yet had a chance to hear it. However, the condition of the divers after the accident indicates to Comex that the entire rescue was carried out in approximately seven minutes.

● A major reconsideration of the value of diving bell drop weights was urged at last month's AODC symposium in Aberdeen.

'It is a widely held view within the diving industry that more people have been killed or injured by the accidental release of these drop weights than have been saved by their deliberate release', Crawford Logan of Seaforth Engineering told delegates.

A spokesman for Det norske Veritas, the Norwegian classification society, said that the society would reconsider its position on this controversial safety feature. Malcolm Williams, chairing the session, unsuccessfully challenged any delegate to give an example of whether these weights had ever actually aided the recovery of a lost bell.

Dropweights' intended function is simple. If a bell's umbilical is severed, the hatch door can be closed, the weights released, and the bell should rise to the surface under its own internal positive buoyancy. Unfortunately this device has backfired in the past when weights slid off a bell accidentally. In one incident the bell promptly shot to the surface, killing one diver and paralysing another with the effects of over-rapid decompression.

Finding some way of holding the weights safely, while still permitting them to be released in an emergency has become something of an insoluble problem for the industry. The Diving Inspectorate at the UK Department of Energy has in the past had to prevent divers from chaining the weights on so securely that they would have been impossible to release. It is now possible that the weights, which severely restrict the design of deep-water bells, could be replaced by a snub line or gas filled lifting bag with some fail-safe method of triggering it from within the bell.

Damaged pipeline may stay on seabed

Forty-two kilometres of damaged oil pipeline laid in the Danish North Sea sector could remain on the seabed if state energy company DONG's proposals are accepted by the Danish Ministry of Energy.

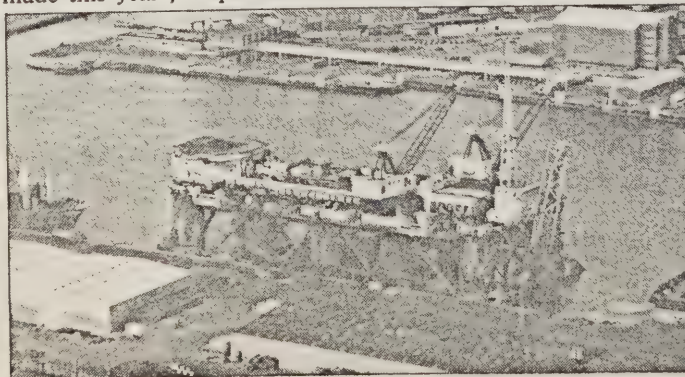
DONG has proposed laying a new line and has already agreed that Italsider in Taranto will supply new pipe. The *Castoro Sei*, Saipem's advanced lay vessel, is waiting in Jutlandia's Esbjerg quay to begin replacement work.

'We sincerely hope that a decision will be made this year', a spokesman for DONG

told *OE*, 'but so far there has been no decision in any direction'.

The insurance companies who covered part of the loss of the original line are reported to be pushing for salvage and re-use of the damaged line. However, there have been no technical proposals made public as to how 42km of 508mm (20in) pipeline, possibly full of water, could be returned to the surface.

The remaining part of the oil line has been laid and was being trenched in early December.



Saipem's *Castoro Sei* waits in Esbjerg harbour for the decision from the Danish Energy Ministry.

Offshore associations get it together

Britain's two leading offshore industry trading associations look certain to merge in due course following agreement this month for the Association of British Oceanic Industries to move into new premises with the British Offshore Equipment Association.

An ABOI meeting in November rubber stamped the proposal for the association not to renew the lease on its Dartmouth Street premises which runs out next year. Instead ABOI will rent offices in Leman Street where BOEA and other associated organisations in the British Marine Equipment Council are to move. In a newsletter to members ABOI chairman Don Milner says that the association would be looking in the future to an 'even closer working relationship' with BOEA with 'a view to complete integration'.

Such a move is seen as making economic sense as well as reducing unnecessary competition between the two bodies. It is also said to be broadly in line with the UK Government's wish to have one strong united association for the offshore industry. Both ABOI and BOEA have just over 100 member companies of which only 18 belong to both.

DECEMBER 1982

OFFSHORE ENGINEER

Dec / 82

P. 19

Locals step up involvement in offshore and ocean engineering

In its quest for opportunities and orders in the offshore oil and gas regions of the world, West Germany's researchers and industry have become increasingly involved in ocean engineering on a broader front.

In addition to companies working singly or jointly through the so-called Arbeitsgemeinschaft set up for specific projects, a number of key associations and institutions are active in offshore and ocean engineering.

Foremost is the Wirtschaftsvereinigung Industrielle Meerestechnik (WIM), which co-ordinates, promotes and carries out studies while making proposals for R&D work, and generally looks after the economic interests of the German oceanic engineering industry.

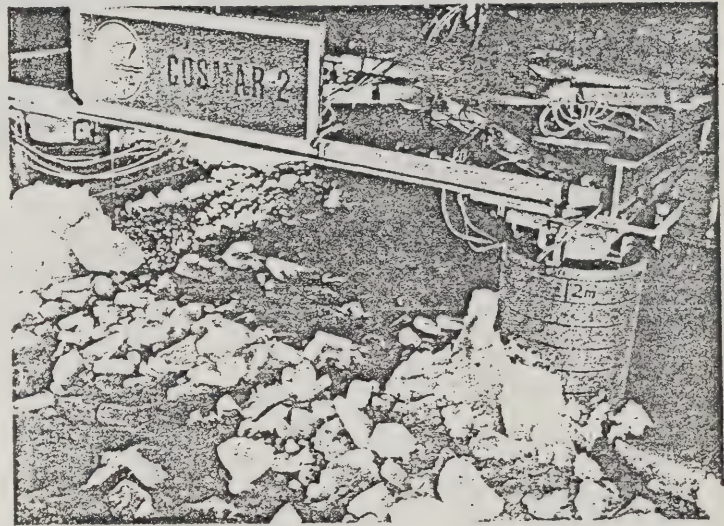
Founded at the instigation of WIM is Arbeitsgemeinschaft Information Meeresforschung und Meerestechnik (AIM), a co-operative group for marine research and marine technology information. The Arbeitsgemeinschaft Meerestechnisch Gewinnbare Rohstoffe (AMR) is a joint venture for ocean mining of polymetallic ore nodules.

Among educational establishments particularly involved in research and development are the ocean engineering division at the Rhine-Westfalian Technical University of Aachen, and the Institute for Ship and Ocean Technology at the Technical University of Berlin.

The Hamburg Ship Model Basin (HSVA) was established in 1913 as a self-supporting non-profit company. It is involved in various investigations of offshore structures, including optimisation tests of mooring systems; measurements of forces on fixed and floating platforms, and the determination of response characteristics of positioning systems.

The facilities include a large towing tank, a small towing tank and a shallow water flow channel. The large towing tank is equipped with a wave maker for regular waves of a maximum height of 0.40m and irregular waves of 0.70m, with a maximum wave length of 20m. The wave maker in the small towing tank creates waves with a maximum height of 0.30m and a maximum length of 6m. Three cavitation tunnels of differing size fitted with the latest

instrumentation carry out work on propulsion and on noise from propellers and appendages. Construction of a new ice model basin began this August and it is expected to be ready by mid-1984. The new basin will offer services for the design of icebreaking ships and of offshore structures in level ice, pressure ridges, rubble ice, broken ice and mush ice. With a length of 78m, breadth of 10m and depth of 2.5m, it will be equipped for a towing capacity of 5t. Our picture shows measurement of forces on an offshore structure in the existing ice model basin built in 1972.



DECEMBER 1982

OFFSHORE ENGINEER



A catastrophic fire outbreak has so far been avoided in North Sea oil and gas operations. OE looks at the causes of fires offshore and some of the measures taken to prevent them. Also in this safety review a diving rescue story based on a Canadian Petroleum Directorate report on a bell lost off Labrador in August this year.

Safety in the North Sea: good practices or good luck?

Fire and explosion are the most dreaded hazards of working with hydrocarbons. Offshore the additional morbid fear is that a serious fire will lead to terminal collapse of the structure and loss of further lives in the sea.

Remarkably the big conflagration scenario has not been enacted in the North Sea even after 20 years of oil and gas activity. Whether this record stems from good fire protection engineering and practice or from good old fashioned luck is far from clear. There is not a great deal of documentation to go by, only opinions which on a sensitive issue such as fire are not especially reliable.

In the UK sector, according to the 1980 Burgoyne Committee on Offshore Safety, there were 90 fires on fixed installations reported between January 1974 and October 1979. Of these 34 were caused by welding and flame cutting.

The report says that every one of the welding fires could have been prevented by simple precautions such as placing incombustible containers below work being carried out to catch any hot metal or slag and surrounding a welder with a simple portable fireproof screen to prevent the escape of sparks.

In one case Burgoyne says that inflammable liquid spilled accidentally was ignited by hot metal allegedly carried by the wind from a welding operation nearly 20m away. Understandably the report recommended an inspection of any proposed welding site for fire risk should be undertaken by the offshore installation manager or safety officer before permission to weld is given.

As for the Norwegian sector two recent studies* by Det norske Veritas, as part of the big Norwegian NTN Safety Offshore research programme, describe some significant differences in the experience of

the Norwegian North Sea and the Gulf of Mexico without completely accounting for the dramatically better record this side of the Atlantic in terms of injuries and death.

From 1976 to 1981 five people were killed and five injured from 133 fire and explosion accidents on fixed platforms in the Norwegian North Sea while in the Gulf of Mexico, in the admittedly longer period of 1956/82, some 80 people died with more than 200 injured, according to the DnV analysis.

Some of the discrepancy may be ascribed to differing reporting practices for injuries. Other relevant factors may be the occurrence of more gas related fires in the Gulf of Mexico and, unquestionably, different safety philosophy and regulations.

However, to add confusion and reinforcement to the DnV authors' point that comparisons with the Gulf may be misleading, it was found that between 1976 and 1978 there was a much higher accident rate in the Norwegian sector. One fire and explosion event per 0.76 complex year was the rate offshore Norway compared with one event per 49 complex years for the Gulf.

Explanation here has been sought in the greater number of enclosed work areas in the North Sea but the DnV studies suggest that the bigger scale of structure and thus activity offshore Norway accounts for the different accident rate.

The worst single fire related accident in the North Sea up to now was the accident in a utility shaft of the Statfjord A platform in 1978 which killed five men.

Four of the men were on the 49.5m deck level when the fire began on work which included oxygen-acetylene cutting, grinding, preheating metal with a propane torch and electric arc welding. The fifth man was in a temporary control room at the 55.5m deck level.

The fire is believed to have started as a result of either an acetylene leak being ignited by steel cutting or grinding or a piece of hot metal setting off smouldering on the wood planked deck. The major fire source was determined as a layer of diesel oil about 2m below the work area which had collected on top of the liquid surface in the annulus.

Subsequent autopsies revealed that the men all died of smoke poisoning, a combination of hypoxia (lack of oxygen) and poisoning by carbon monoxide and other gases. Two men were found in the lift about 2m above the deck level. Investigation indicated that the lift, fitted with optical control devices, stopped because the devices reacted to the smoke.

General conclusions of the DnV study of Norwegian fire and explosion accidents seem to echo closely the UK experience. The vast majority of accidents, 80% in the Norwegians' case, caused little or no damage to property.

In around 60% of the cases welding and cutting were responsible for ignitions giving rise to a number of predictable recommendations, based partly on the proposition that most large and serious fires begin in the same way as small ones.

Better checking for flammable materials before welding and cutting; better housekeeping and storing of rubbish, tarpaulins, ropes, etc; and better shielding and insulation of exhausts, pipes and other hot surfaces are all advocated.

Accident prevention measures suggested in the light of the Gulf of Mexico study differ only in the addition of more

*Fire and explosions on fixed platforms in the Norwegian North Sea. Report No 81-1175. Fire and explosions on offshore platforms in the Gulf of Mexico. Report No 81-1221. Both published by Det norske Veritas Research Division. PO Box 300, 1322 Høvik, Norway.

inspection. This recommendation followed the finding that as many as 46% of all accidents fell into the mechanical failure category. An even higher percentage of serious accidents fell into this category.

Not surprisingly the two accidents ending in the loss of a platform in the Gulf both resulted from blowouts, so it is worth remembering that the number of blowouts in the North Sea has been mercifully few. The fire accident toll in human lives would be very different, for example, if the Ekofisk Bravo platform had caught fire in the 1977 blowout in the Norwegian sector.

There are a number of ways of looking at the North Sea fire performance but the awareness among offshore personnel of potential hazards has undoubtedly increased, according to a spokesman at the Offshore Fire Training Centre, Montrose. Anyone working permanently offshore in either the UK or Norwegian sector will have undergone at least a basic four day fire training course as a result of guidelines laid down by the UK Offshore Operators Association and regulations implemented by the Norwegian Government.

The Montrose centre, sponsored by most but not all UK operating companies and run by the Petroleum Industry Training Board, processed some 2,155 delegates through the basic fire training last year and over 3,000 through more advanced courses

in line with the operators' growing tendency to develop specialist fire teams on fixed installations.

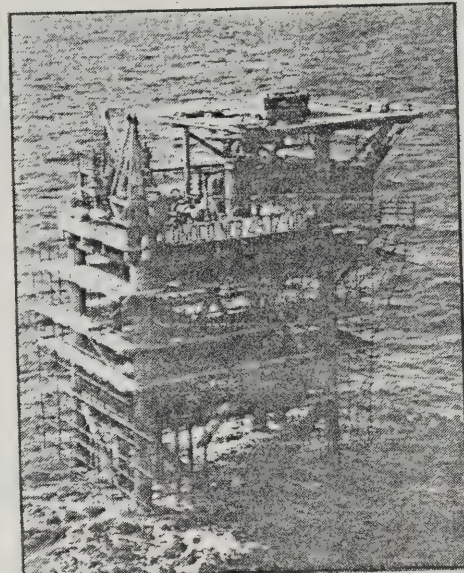
Although permanent offshore personnel can be expected to have had training a dark figure surrounds the number of contractor employees who may not come under the training net because of constant flitting between projects and brief work programmes offshore.

Training can only do so much, however. It can be described as an educational process which can help to avoid the panic situation and promote awareness of likely fire hazards.

Needless to say, complex fire protection engineering systems and constant research and development of new and safer equipment is needed if fire safety offshore is to succeed.

The recent £3 million contract for supply and design of the fire detection/protection of five offshore platforms on the British Gas Morecambe Bay gas field typifies the technical sophistication now demanded by offshore operators.

In awarding the contract to Wormald Fire Systems, the Mather and Platt subsidiary which has installed around 60% of UK platform fire protection systems, British Gas did not in fact stipulate distributed rather than central control although this is becoming an increasing



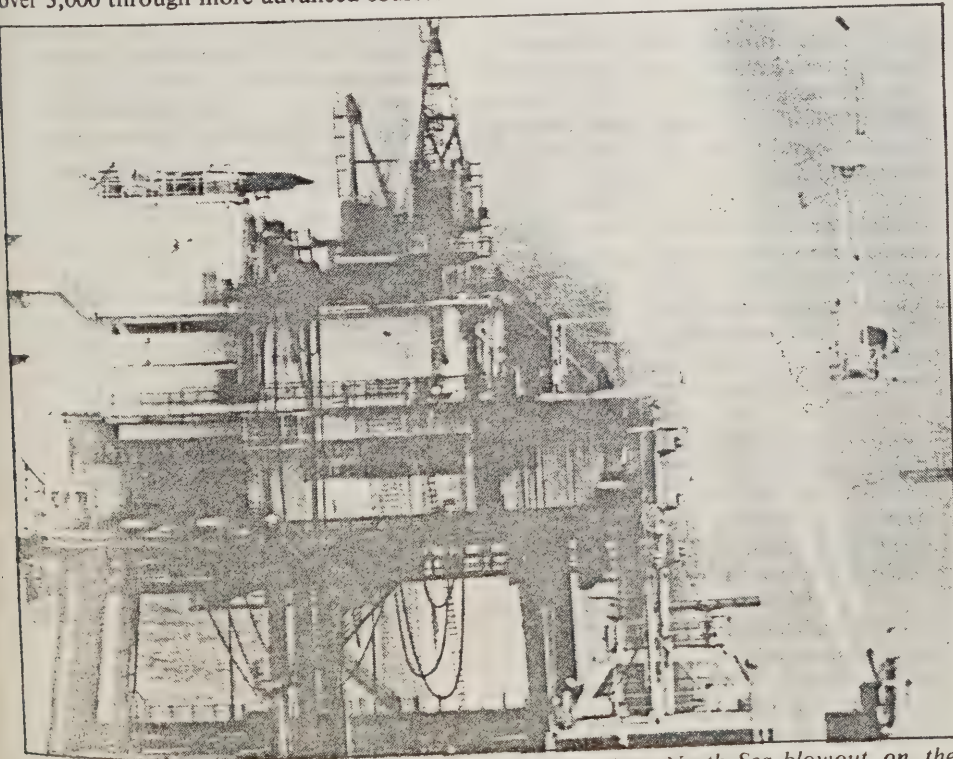
An experiment on the Conoco Viking field DD satellite platform is testing fire retardance of scaffold boards.

requirement. Many operators are becoming ever more weight conscious of multi-core cables in centralised systems as well as the size of control panels.

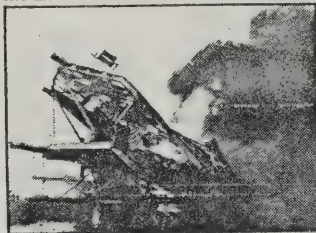
As might be expected, however, the Morecambe Bay system makes use of the fast developing micro-processor technology now available which will continuously monitor changes of state through all the platforms, initiate appropriate action and display alarms and faults on the main console or panel, the nerve centre of the system housed on the accommodation platform.

Wormald is providing all the fire detection and firefighting equipment for the field including heat, smoke, flame and gas detectors; sprinkler and deluge valves, water nozzles, foam proportioners, extinguishers, hydrants, hose reels, fireman's equipment, crash equipment, skid mounted halon, 600psi bulk system, skid mounted deluge and sprinkler equipment and foam monitors.

Over and above the modern fire detection/protection systems provided by companies like Wormald there remains the vital issue of structural fire protection. In the UK sector this is dealt with for offshore installations under construction and survey regulations which require the certifying authority to ensure, among other things that accommodation is so placed and constructed as to afford occupants protection from fire; that every deck, passageway, walkway, stairway and ladder incorporates 'features affording protection against fire including the isolation of areas



Thousands of gallons of oil spewed out in the only serious North Sea blowout on the Ekofisk Bravo platform in April 1977. Fortunately it did not catch fire.



means of fire resisting bulkheads and doors capable of being opened from either side'; and that separate escape routes lead safely to abandonment stations.

The Burgoyne Committee expressed some concern about the lack of protection of escape routes although recognising the difficulty of achieving this. Pointedly Burgoyne alluded to the potentially more serious anomaly that no legislation covers the protection of structures from fire on the platform which conceivably could cause serious damage especially to steel platforms.

Any solution to that particular problem would require major development work. On a less grandiose scale one intriguing minor research project that may provide surprising returns in better fire safety, given the nature of most accidents in the North Sea, is an offshore test underway on Conoco's Viking field DD satellite platform in the southern gas basin of the North Sea.

All the available scaffold boards used offshore have been placed on the platform to test the claims of one manufacturer that its treatment of wood does not suffer from

the leaching of fire retardant salts. Hickson's Timber Products and Palmer Scaffolding say that a new process involving vacuum pressure impregnation to timber of a special combination of chemicals, based on an organic water soluble monomer, dispenses with the problem of leaching altogether and provides continuous fire retardance.

Time will tell whether the research is proved successful. The real lesson of that mini-project is that nothing can be left to chance where fire safety is concerned.

Slack in umbilical blamed for loss of bell off Labrador

Development of slack in the umbilical as it was payed out from the winch drum resulted in the loss of a bell 197m of water off Labrador last July, according to a Canadian Petroleum Directorate report.

The umbilical was severed on board the drillship *Pelerin* at 1521 hours on 16 July 1982, sending an MOB 1000 (Manned Observation Bell) to the seabed. *Pelerin* was drilling in the Northern Labrador Sea on the Pothurst P-19 well. Both bell and occupants were safely recovered at 0146 hours the following day.

Pelerin is owned by Helmer Staubo and was contracted out to Petro-Canada, operators of the well. The MOB 1000 was operated by Hydrospace Marine Services also under contract to Petro-Canada. The bell is a two-man, one atmosphere observation bell with an umbilical which provides power, communication and in-water lift. All other life support systems are self-contained with enough air and food for 72 plus hours. A heave compensator connected to a series of pullies maintains constant tension and takes up any slack in the bell's umbilical.

The bell was mobilised to dive and observe cement returns on the sea floor during the cementing of the 762mm (30in) casing. Petro-Canada requested that one of its drilling engineers be a participant in the dive.

After a pre-dive safety meeting a number of safety precautions were taken. A wire grommet and safety sling were attached to the MOB, lifting slings and a personnel basket for the crane, fishing tool and underwater camera were placed on standby, and the ship was made ready to release from

bottom. Rescue procedures discussed included the need for the bell to remain on the bottom for three hours 15 minutes if communications were lost, to give time for rescue attempts with drill string fishing tool. If this failed after three hours the ship would move up current and 15 minutes later the bell was to drop her weights. *Balder Cabot* with two Mantis manned submersibles was available locally. Weather was good.

Ten minutes after the moonpool doors opened, after the safety strap had been attached, the ram was opened and the dive supervisor began deployment of the MOB's main umbilical. The pilot began thrusting downwards and rotating the MOB to face the drill string.

A loop formed in the umbilical at the winder drum. Observing this the compensator operator shouted 'stop the winch'. When the winch stopped it was noticed that the umbilical loop had jumped off the winch drum and onto the shaft cover. It may also have caught in the worm gear under the drum.

As the MOB descended, taking in the slack, the umbilical was brought into tension across the drum lip and severed. The MOB then fell towards the seabed losing main power and communications, the extended position of the manipulator arm causing a slight forward list.

Emergency power was restored automatically to the communication and chemical scrubbing systems. The MOB hit the seafloor with a mild impact which did not appear to damage the subsystems. One negative buoyancy dropweight rack was forced against the ballast tank, bending the inboard portion of the rack assembly and

pressing the drop weights firmly against the outboard angle supports of the rack. The MOB had come to rest in 250mm of very soft mud, with a slight forward list. The pilot and the drilling engineer immediately donned survival suits.

An undersea acoustic teletransducer was lowered into the water. Voice communications could not be re-established immediately, but morse code signals were sent and received by the MOB occupants. An onboard sheet of emergency morse phrases enabled the pilot to translate the morse signals.

Balder Cabot was requested to steam at full speed to the site. A helicopter was dispatched to *Pelerin* and an Air King fixed-wing aircraft was placed on standby. A tv camera was rigged to the drillstring. The cementing procedure was stopped and the hole displaced with seawater.

Voice communications were established with the MOB. All occupants were reported unhurt and the MOB was upright. Casing was pulled out of the hole and hung in the moonpool. Petro-Canada and Staubo met and agreed to move the ship up current to allow the MOB free ascent.

The pilot attempted to jettison the umbilical. The severing device operated properly, but the flotation device was caught in either the emergency lifting sling or the bell's top works so that neither collar nor umbilical floated free. The pilot then attempted to jettison the drop weights. The cable cutting device worked and the port side weights were released.

The starboard side weights however were firmly jammed in the rack and would not fall clear. The occupants attempted to rock the bell clear of the mud, but silt



A Mantis one atmosphere submersible on board Balder Cabot off the coast of Labrador, Canada.

turbance by the MOB's bottom ring indicated to the pilot that the mud was not holding the MOB down.

The pilot then attempted to jettison the manipulator but as it was not fully extended, it failed to clear the bell. Another attempt to jettison the umbilical and drop weights also failed. The ballast tanks had been fully charged and with one set of drop weights still in the rack, the MOB was still negatively buoyant and unable to ascend to the surface. The pilot was advised to abort further attempts at free ascent and be ready for recovery by a Mantis.

The dive supervisor and two divers from *Pelerin* boarded *Balder Cabot* with rough-water communications equipment and diving gear. Eight kHz through-water voice communications were re-established with the MOB, as *Balder Cabot* dynamically positioned itself 30m and 313° from the bell. *Pelerin* was 500m from the MOB. A large ice floe had been advancing slowly from the north east but remained stationary six or seven kilometres away during this operation.

After deployment of Mantis 8 through the *Balder Cabot* moonpool, the submersible pilot reported that he had picked up the MOB's 37.5 kHz pinger but visibility was poor because of silty bottom conditions in a half knot current. Mantis 8 located the MOB's lights while conducting a pinger sweep.

The Mantis then attempted to pull the umbilical free, without success. An attempt to free the flotation collar also failed. *Balder Cabot* manoeuvred itself over the MOB and lowered a lifting cable and shot weight to within 5m of Mantis 8. Mantis recovered the hook and attached it to the frame of the MOB.

The end of the recovery line became entangled in one of the Mantis' four thrusters. Attempts were made to unfoul the line without success. Since the Mantis still had ample manoeuvrability with the remaining three thrusters, and there was no immediate danger, it was decided to continue with the rescue operation, and lift both Mantis and bell simultaneously.

Both were lifted to just under 16m. A diver entered the water to secure a wire rope to the MOB. He also succeeded in freeing the flotation collar. The MOB was lowered to 30m to take up slack on the recovery line and the Mantis was released. Using a one tonne winch the MOB was lifted in 7.6m increments, to allow the lines to be rigged at each step.

After a total recovery time of 10 hours 25 minutes, the MOB occupants were medically examined on board *Pelerin* and declared fit.



The report of the Canadian Petroleum Directorate concluded that the incident was directly caused by the development of slack in the umbilical as it was payed out from the winch drum. This was due to the umbilical being deployed too rapidly and the heave compensator being pressurised improperly, thereby rendering it incapable of taking up slack. Slower deployment of the umbilical or faster thrusting of the bell might have prevented the development of slack. Proper operation of the heave compensator might also have prevented excessive slack from forming in the umbilical.

The report added that a number of safety devices which form an integral part of the MOB system failed to function properly during the recovery operation.

It was apparent that Petro-Canada, Staubo and Hydrospace Marine Services were adequately prepared for this emergency. Diving personnel of both the MOB and Mantis were also adequately trained. The report also found that the crew of *Balder Cabot* exercised sound judgement and due caution throughout the recovery operation.

The report's recommendations related only to the incident under investigation and made no attempt to cover all possible lost bell scenarios. They were:

- A more comprehensive training programme should be instituted to give operations personnel 'hands-on' experience in all aspects of MOB operations. The present training arrangement permitted training dives only to the bottom of the cursor. It did not permit the rams to open with the MOB leaving the cursor, the point at which this incident occurred.

- The gauges of the heave compensator should be marked to indicate their normal operating position.

- A removable guard or cover should be placed around the winch drum to prevent a loop from leaving the drum.

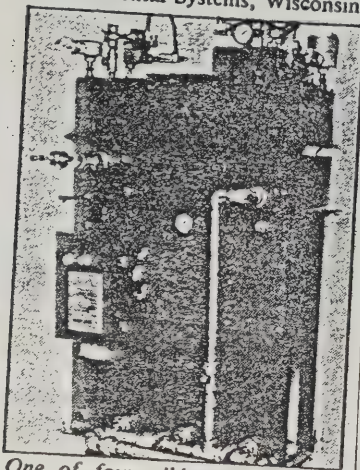
- The design of the MOB drop weights should be examined to identify modifications which could prevent malfunctions should a similar event occur in the future.

- The configuration of the umbilical flotation collar should be modified to preclude its jamming in the MOB top works during deployment.

- The MOB should be capable of blowing ballast under emergency power. This could be done by making the ballasting pump system operable from onboard battery power or, by installing compressed air tanks and connecting them to the ballast system.

Separators for Labrador rigs

Four Inverto 50 oil/water separators have been shipped by Marland Environmental Systems, Wisconsin,



One of four oil/water separators produced by Marland Environmental Systems for use on two CFEM jack-ups being built for Global Marine operations off the Labrador coast.

to Constructions Francaises d'Enterprises Metalliques for use on two jack-up drilling rigs. The rigs are being built for Global Marine, Houston, for petroleum exploration off the Labrador coast.

The compact self-cleaning separators can handle 5t of bilge water per hour.

The manufacturers claim that they use a unique coalescing bed process together with a patented plate separator that requires no filter changes or backflushing downtime.

Offshore Engineer

Dec/82

P. 62

Safe at sea!



With a SANA MARINE Medical cup-board you can feel safe onboard in more than one way. Not even heavy sea can destroy the bottles and glasses, because the medicaments are safely and efficient stored behind unbreakable acrylic-glass mounted in front of each shelf. A build-in Drug cabinet also eliminates the possibilities that drugs shall go astray.

SANA MARINE is the only Medical cup-board built according to «Norwegian Standard», and its combination possibilities offer the best solution to the customer's different and altering requirements with opportunity for additions and changes later on. The units are made from the best chipboard covered all over with chemical resistant white melamine. The surfaces are resistant to detergents, disinfection solutions and 70% ethylalcohol.

Below is pictured the standard design, baseunit with shelves and drawers, and topunit with build-in Drug cabinet. The doors are provided with brakes (and does not slam.)

Kindly contact us for further informations:



AS MØBELFABRIKK A/S, Moerveien 29, 1430 Ås
(Norway) Phone (02) 940088

Offshore Engineer
Dec. /82
P. 73



NUTEC

NORWEGIAN UNDERWATER TECHNOLOGY CENTER

is an independent organization, established by Det norske Veritas, The Royal Norwegian Council for Scientific and Industrial Research, Saga Petroleum, Statoil and Norsk Hydro. The former Norwegian Underwater Institute (NUI), established in 1976 has been fully integrated in NUTEC. NUTEC's aims are to provide facilities, underwater installations and expertise for testing equipment and integrated systems to be used under water. The organization is a competence Center for underwater technology, diving techniques and hyperbaric medicine. The Center will carry out research and development in these areas.

NUTEC will also offer its services for teaching and training purposes for the offshore industry. The Center's main office is situated in Bergen.

"NUTEC FJORDBASE", a 2000 ton test- and research vessel, intended for full scale test of u.w prod. systems was put into service Sept. 30th this year. NUTEC will be in a build up phase in the coming 2-3 years period.

SENIOR POSITION

NUTEC is seeking highly qualified senior staff, department manager/project manager, within the underwater technology field. NUTEC will be engaged in a number of projects in connection with the development of new fields in the N.C. Shelf in cooperation with oil companies engineering firms, classification companies and operators.

Applicants should document qualifications as a leader, should possess good cooperations abilities and should be well established in his field, age preferably between 40-50.

Applicants will initially be engaged as senior project leader on large development underwater technology project, engineering development, dry tests in the Center (workshop), full scale fjord test (test- and research vessel) and evaluation of results. The organisation is in a dynamic development stage with many new and challenging opportunities for the right persons.

Salary according to qualifications. Good pension and insurance schemes. NUTEC will assist and help with accommodation.

Interested should send application, which will be treated confidentially, to NUTEC, Mang. dir. Jan A. Andersen, Gravdalsveien 255, 5034 Ytre Laksevåg, Bergen, by the 20th November 1982.

C-Core plans sea ice source book

THE CENTRE FOR COLD OCEAN Resources Engineering (C-Core) of Memorial University in Newfoundland has received a grant of \$250,000 from the Max Bell Foundation to support the compilation of a sea ice environments source book.

The object of the project is to compile and integrate existing environmental information about the occurrence, dynamics and strength of sea ice in Canadian waters as a data base for the preparation of design standards. Eventually the project will create an on line computerized data base and an illustrated reference source. It was

initiated by E. Reimer, leader of the ice properties group and will be managed by Chantal Roche, with an advisory panel of industry and government experts. Matching funds are being sought from other sources.

Oilweek

Jan. 10/83

P. 38

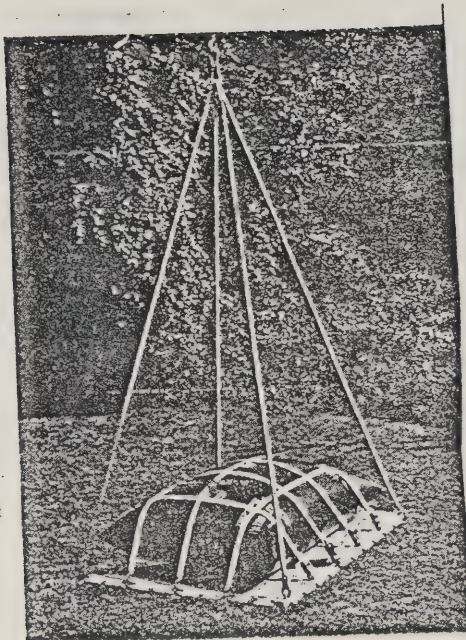
Hutton TLP setback. Cracks in four of the six vertical legs of the Hutton tension leg platform reportedly may delay the project by six months to a year. The cracks, for the most part less than 0.250-in. deep, are in fillet welds joining ring stiffeners to four columns. Two remaining columns have been accepted.

It is not known if the welds will be reworked or if the columns—valued at some \$40 million—will be scrapped. Even before this problem surfaced, unanticipated design work escalated TLP cost to more than \$1 billion. But Conoco insists that the concept is sound and that the platform will be completed.

World Oil

Jan /83

P.21



Airborne fuel barge

The Aerial Fuel Barge is a recently developed helicopter air lift system for safe fuel transport and dispensing that provides a compact and simple means of transporting fuel and other liquids to remote and inaccessible areas. The rugged system is based on the manufacturer's 500-gal, state-of-the-art Combat Duty collapsible tank. This pillow-style bladder tank is constructed of a DuPont Kevlar reinforced elastomer specially formulated to resist extreme weather conditions and rough handling. Most any fuel, including gasoline, Avgas, diesel and kerosene, can be air lifted in this bladder. Other components in the system include a 10,000-lb capacity air cargo pallet, seven nylon tie-down restraints, a heavy-duty aerial lift sling and fill/discharge connections and valves. No special tools or training are required and the system can be made operational in minutes. (Aero Tec Laboratories, Inc.)

World Oil
Jan/83
P. 180

Mobile Rig Construction

Joint efforts to create climatized semi

Norsk Hydro Produksjon A.S. of Norway wanted a combination of engineering capability and drilling experience in Norwegian waters to engineer, construct and operate a harsh environment semisubmersible.

The joint venture company formed by Sonat Offshore Drilling (SODI) and Wilh. Wilhelmsen (WW) of Norway was awarded the contract in mid-September after competing with major drilling contractors worldwide.

The rig will be the first completely enclosed and climatized semi to operate year round at latitude 72° north on Tromsøflaket, the Norwegian continental shelf. Currently, the Norwegian government does not allow year

round drilling in the area because of the arctic conditions. However, new leases have recently been allowed in the area and for this reason, the success of Project 85 will be of significant interest to other drilling contractors and oil companies.

An office in Oslo, Norway, provides a direct link to the Norwegian Regulatory Bodies and the client, Norsk Hydro. Each regulatory agency has appointed a representative to the project, giving it a great deal of visibility in Norway.

Project Manager Don Ray comments, "Our primary objective in this project is to operate year round in a 'shirt sleeve' environment—even though the temperature outside is

below freezing. All work areas will be completely enclosed and heated, which brings two major concerns to light. One, how to heat the rig efficiently and two, how to provide adequate ventilation.

"Enclosing the work creates ventilation problems that ordinarily wouldn't exist. We're looking for ways to preserve the air we heat and prevent it from being thrown away as more air is pulled in. These are some of the major concerns in designing an enclosed semi," he says.

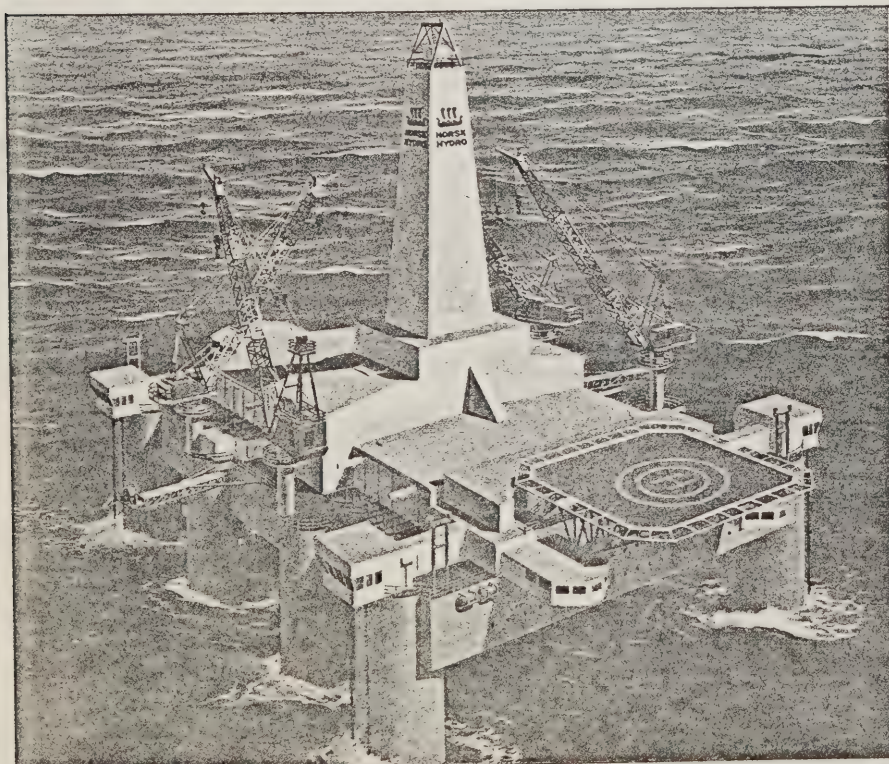
Ray says the University of Trondheim currently is performing an environmental study of the area where the rig will drill. The results of their findings on wind and wave conditions, currents, and precipitation will be important to the staff in establishing environmental and operating design criteria.

The study also will be examining the conditions that cause icing and ice buildup. Experience from the Navy and fishermen with icing will supplement the study, he says.

The first step in designing a semi is the topside arrangement. Jim Magill, manager of engineering for the project explains:

"The topside layout or general arrangement is designed for maximum operating efficiency. In other words, the design of the entire semi begins with the design of the drill floor. The most advanced drilling equipment and technology will be used and incorporated into the arrangement. At that point, a final topside weight can be estimated."

Unlike any semisubmersible ever built, Magill says, this semi will have a pipe-handling system that is completely automatic. From the pipe rack to the rotary table, rig hands will seldom have to handle pipe. This has



The Norsk Hydro rig, which is now being designed by Sonat Offshore and Wilh. Wilhelmsen, will be a drilling pioneer working off the Northern Coast of Norway.

never been done from a floating vessel before, which places this rig at the forefront of drilling technology, Magill says.

"Once we've defined the upper deck," Magill says, "we will develop the supporting hull. Following this, we will send bid packages out to shipyards worldwide for quotation."

A final report will be submitted in March, and should Norsk Hydro elect to proceed with the project, model basin testing will be done to verify the theoretical calculations. The projected delivery date for the rig is the first quarter of 1985.

Polar Frontier Drilling A/S is the Norwegian company that is being formed by the joint venture to operate

the semi. Sonat Offshore Drilling and Wilh. Wilhelmsen will work to complement one another's strengths, resulting in a joint venture that has the optimum blend of technical skill and operating experience.

Sonat Offshore has also announced construction plans for a new class of semisubmersible marine drilling rig designed to operate in severe environments and greater water depths than any existing rig of this type. These construction plans are in addition to the previously announced joint venture with Wilh. Wilhelmsen to design a semisubmersible for Norsk Hydro.

The new semisubmersible drilling rig will have a totally enclosed, wa-

tertight upper hull containing the drilling machinery and accommodations for 150 personnel. This rig will be designed and built to be conventionally moored in water depths up to 2,000 ft.

The design will also have the capability of operating in the dynamically positioned mode in up to 10,000 ft of water. The rig will be capable of working in severe winter weather.

Sonat said that it has contracted with Mitsui & Co. Ltd. and Mitsui Engineering and Shipbuilding Co. Ltd. to jointly develop the new semi. The vessel will be registered in the United States and will also meet Canadian, United Kingdom and Norwegian regulations. □

Offshore

Jan/83

P. 40

(2 of 2)

New RS 35 semis designed for North Sea

The increasing demand for exploration drilling and early production systems in the hostile environment north of the 62nd parallel in the North Sea has led to the development of a new generation of semisubmersibles called the German RS 35. As the trend in the search for oil and gas is towards

exploration in deeper and rougher waters, a careful balance between economics and safety is required.

These criteria led to a novel design which distinguishes the RS 35 from existing semis. The fundamental concept of the RS 35, which is estimated to cost \$125 million, is of a uniform and well balanced sub-

merged ring hull of tubular sections, with the deck and superstructure carried on four vertical columns.

The design combines the latest technology with the requirements for worldwide drilling operations under severe and varied environmental conditions. The excellent motion characteristics and the large payload capacity deriving from this concept ensure economical year-round operation.

The double-walled ring and columns and the enclosed deck grid provide a high standard of safety. The columns are ice-strengthened for operations in arctic waters.

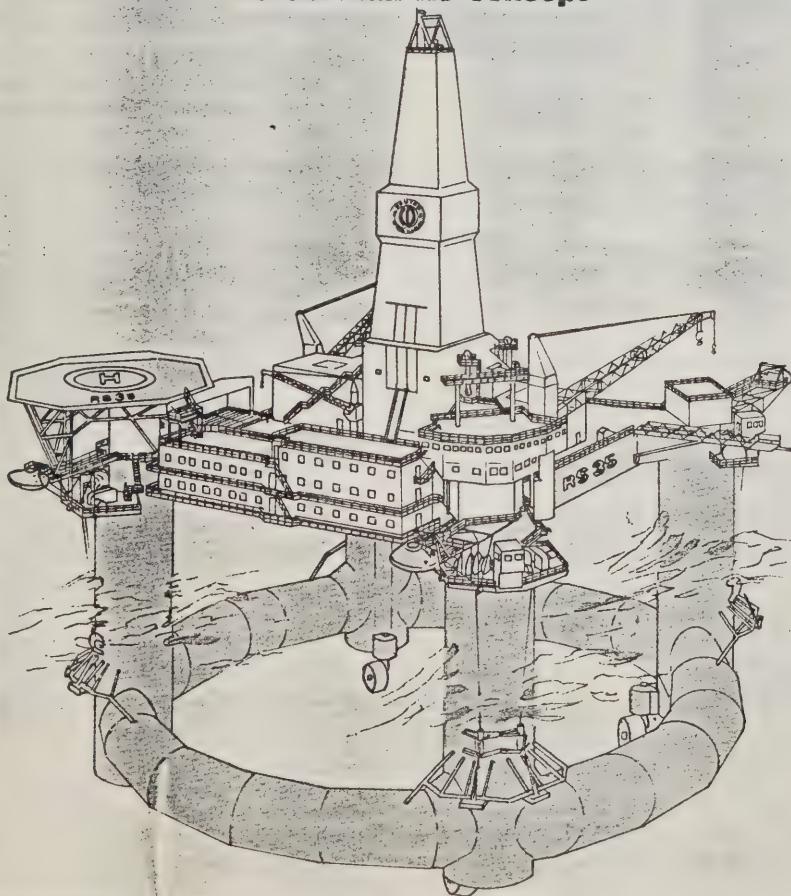
The structural stability of the ring hull allows a construction free from cross-bracing between the columns. The uniform shape of the ring and the columns facilitates economical sectional fabrication and assembly.

The diesel-electric propulsion system consists of four thrusters, each of 5,010 kW (6,810 hp), providing full azimuth steering, each driven by three 1,670 kW (2,270 hp) electric motors.

The thrusters can be raised above the operational waterline on guide rails for easy maintenance or repair. The power supply is from six diesel generator sets, each supplying 4,400 kW (6,000 hp) and giving a total capacity of 26,400 kW (36,000 hp).

- In addition to the central control of the propulsion and power systems, the bridge contains all nautical instrumentation, the dynamic positioning control equipment and monitors for the drilling operations and materials handling systems.

The German RS concept



Capacities

Portable water:	944 bbl
Drilling water:	6,290 bbl
Diesel fuel:	22,204 bbl
Liquid mud:	2,868 bbl
Bulk materials: barite	12,360 cu ft
Cement:	7,063 cu ft
Sack materials:	5,000 sacks
Casing in ring hull:	188 lengths x 13 3/8 in., approx. 8,000 ft
	336 lengths x 9 5/8 in., approx. 14,000 ft
	39 lengths x 7 in., approx. 4,000 ft

The RS 35 can be dynamically positioned by a computerized system, or alternatively it can be moored by eight anchors each equipped with 5,400 ft of chain, for 1,640 ft of water.

The derrick is located in the center of the platform deck. Two cranes are available for material handling on the platform deck and for supply boat operations. A third crane is installed near the derrick, primarily to handle casing and drilling equipment between the pipedeck and the rig floor.

Casing storage is provided in the ring hull. An automatic conveyor system has been developed to move casing between the ring hull and the pipedeck.

Bulk mud materials and cement are stored in the ring hull. Mud mixing, mud treatment and sack storage facilities are located in the drilling modules in the platform deck. These modules also contain the cementing pumps, the DC-power controls, the emergency generator and workshop facilities. The active and reserve mud tanks and the mud pumps are integrated into the structure of the platform deck. The water ballast and trim tanks are located in the ring hull and in the vertical columns.

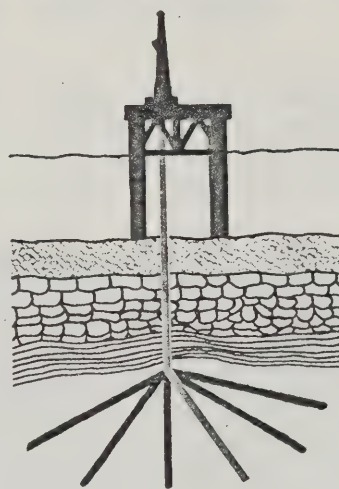
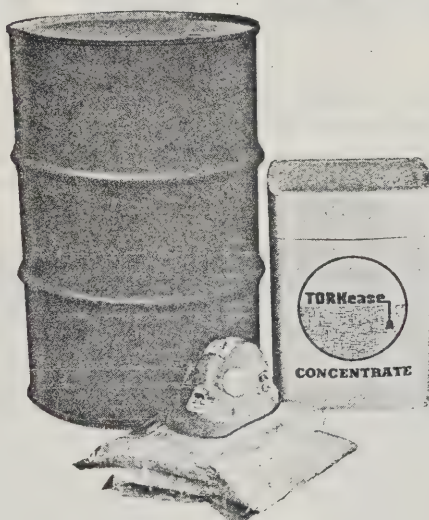
• Emergency exits, lifeboats and survival capsules comply with the stringent regulations of the various classification societies.

• The helideck, designed in accordance with international regulations, is capable of handling all types of helicopters, including the Boeing Chinook. □

Operational characteristics

Displacement condition:	light	21,500 tons
	transit	28,710 tons
	survival	36,080 tons
	operation	40,700 tons
Draught condition:	light	23 ft
	transit	32 ft
	survival	66 ft
	operation	92 ft
Airgap (operation):		40 ft
Anchored water depth (max.):		1,640 ft
Dynamically positioned water depth (max.):		3,300 ft
Maximum drilling depth:		25,000 ft

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Mobile Rig Construction

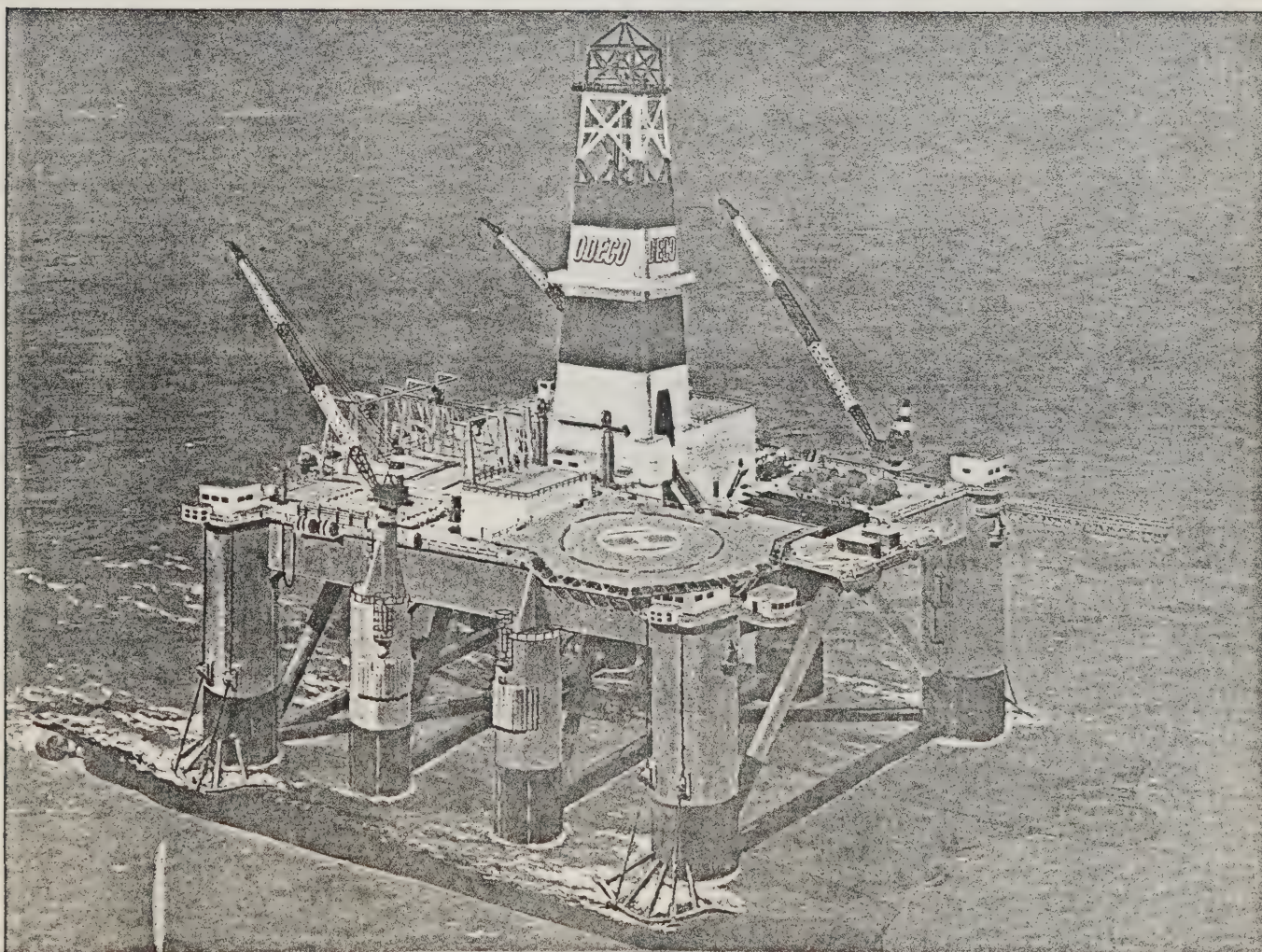
Odeco super semi built for arctic work

Capacity, high performance and efficiency have been the guidelines for the development of the Ocean Odyssey, Ocean

Drilling and Exploration Co.'s new super-class arctic semisubmersible drilling rig.

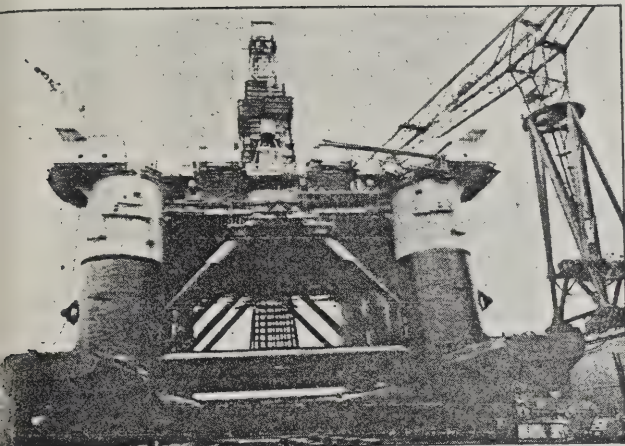
Launched last August at the Op-

pama shipyard of Sumitomo Heavy Industries Ltd. in Japan, the huge rig will work for Atlantic Richfield in the Gulf of Alaska after outfitting and

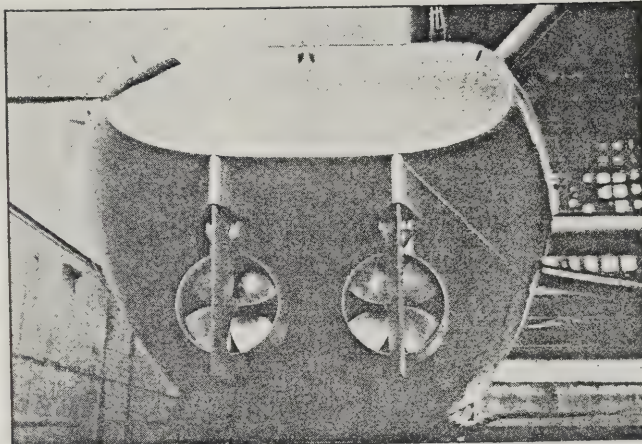


Odeco's new semisubmersible Ocean Odyssey will head for Alaska to drill for Arco after commissioning next month.

**The Odyssey will be extremely winterized;
all equipment and systems
are designed for services in temperatures
as low as -35° C.**



Large pontoons and ice-strengthened columns dominate this shot of the super-class arctic semi in drydock.



Twin 9-ft-diameter propellers on each pontoon are a redundant feature to ensure the rig has backup available propulsion.

checkout of the equipment now being installed.

Scheduled for commissioning in February, the rig will be a U.S. flag vessel fully certified by the U.S. Coast Guard and classed ABS-AMS A-1 for unrestricted worldwide ocean service. It is a 390-ft-long, 226-ft-wide, twin-hull design with a 12,450-hp propulsion system.

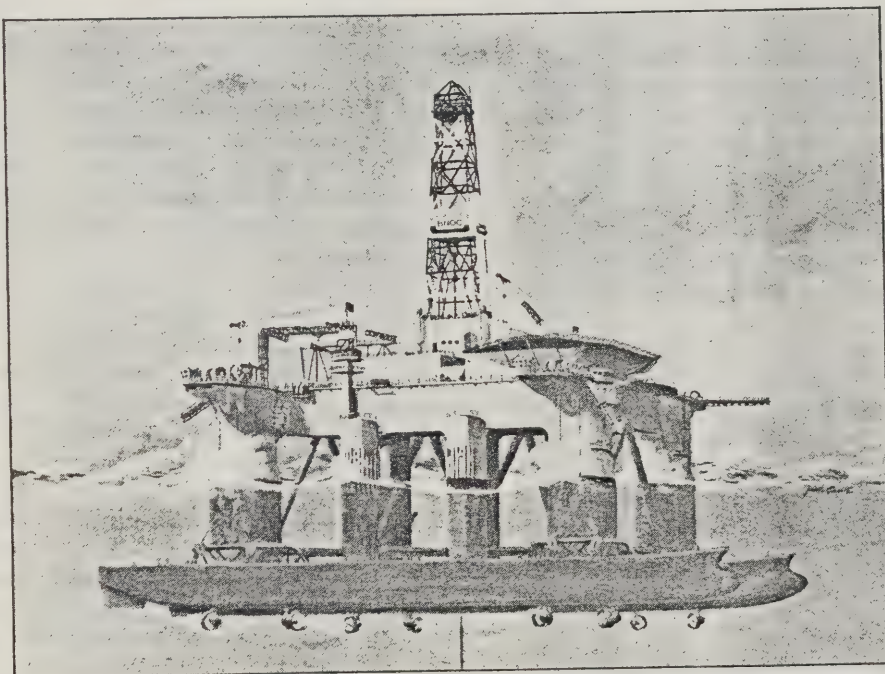
The hull consists of two shipshape parallel pontoons which will enable a calm water transit speed of 12 knots. The rig's structure is designed to simultaneously withstand 100-knot winds, a 3-knot current and 110-ft waves.

Arctic drilling

The Odyssey will be extremely winterized and all equipment, and systems are designed for service temperatures down to -35° C. The derrick will be fully enclosed with steel to 115 ft above the heated drill floor permitting all-weather operations.

Dr. Terry D. Petty, Odeco vice president-Design & Engineering, says the rig's columns have been ice strengthened and "can take some impact of floating ice." Petty says a structure similar to an old steam locomotive's "cow catcher" was installed to keep floating ice off of the marine riser, a problem in arctic drilling.

The semi will have a riser-handling system to eliminate the need for cranes to move the marine riser in extreme wind and sea conditions. Three revolving cranes will service



The Ben Odeco/Britoll DP Semi, known as Scott Lithgow Hull 2002, will be capable of drilling to 25,000 ft in 4,500 ft of water.

the main deck and peripheral areas.

The Odyssey has a 70-knot operating mode and can survive 100-knot winds with a 4,500 ton deck load without deballasting. Petty says wind speeds in the area where the rig will be working often exceed 70 knots.

The super semi will accommodate 102 men and will drill at the 80-ft draft in 1,500 ft of water. The basic mooring equipment will consist of eight windlass units equipped with 5,500 ft of 3¼-in. special strength

chain per windlass.

Drilling depth capability will be 25,000 ft. The drilling equipment will include a derrick rated at 1,400,000 lb static hook load, a 4-speed, 3,000 hp drawworks assembly, a 49½-in. 1,200-hp rotary and two triplex mud pumps each driven by a 1,600-hp DC motor.

Well control equipment will include an 18¾-in. by 15,000-psi WP BOP stack. Power will be supplied by six turbocharged 16-cylinder (2,950 continuous brake hp) engines. □

Terrorists see offshore as tempting target

Robert Charm
Special Correspondent

Terrorism. It is an unpleasant subject and such political dynamite that officials at the State Department, the FBI, the CIA and the Defense Intelligence Agency will retreat behind a wall of "no comments" or bland statements of reassurance whenever it comes up.

Yet, in the wake of the Lebanon crisis that saw PLO terrorists dispersed throughout the Arab world, in light of left wing revolutionary activity throughout Latin America, and considering the anti-American sentiment rising in Europe, intelligence experts are preparing for a new wave of terrorism, with business interests of Americans as the likeliest target.

Who are seen as the most likely victims? The corporations that have come to symbolize American economic power—the oil companies.

"The operator of an offshore rig has got to recognize that his operation is a potential target," says Jeffrey Miller, operations director for Law Enforcement Training Associates, a Boston-based company specializing in risk assessment and security preparations for industrial operations. "This is not James Bond fantasizing. This is not spy novel speculation. They are targets and they better be prepared."

Miller and his associates all have extensive experience in the interna-

tional war against terrorism. They have all served with the United States Special Forces in counter-insurgency work as well as with such crack foreign units as the German GSG-9, the British Special Air services, the Berlin SEK and other covert action agencies whose nature is classified.

"We have studied the feasibility of taking over an offshore complex, and we were amazed at just how easy it is. They are perfect targets: undefended, valuable, populated with civilians, guaranteed to garner a lot of publicity in the event of trouble."

He outlined a likely scenario.

"The target might be one of the Mexican platforms in the Bay of Campeche. Let's say it is a left-wing Mexican extremist group—and you'll be seeing a lot more of them as the (Mexican) economy continues to collapse—hijacks a helicopter servicing a rig. There are, say, ten terrorists. That would be enough.

"They are armed with automatic weapons, demolition explosives, grenades. They fly to the platform and land without problems. No one knows they are coming because there are no recognition codes in service beyond the usual radio requirements. The pilot has no way of tipping anyone off.

"They land. They shoot one or two surprised workers who may have instinctively tried to do something. There is a mad scramble on the plat-

form as the terrorists deploy to take over. More workers are killed when they try to barricade themselves in control centers or dormitories and the terrorists shoot through the doors. In a few minutes it is all over, though, and the platform is secured. Believe me, it is that easy. Remember, these are construction workers, not soldiers.

"The crew is herded into one area under guard while the terrorists radio their demands to the company and the Mexican government: \$20 million. Food for the poor. Free political prisoners, etc, etc. Twenty-hour deadline until they begin killing the hostages one by one. In the meantime, as a little bargaining pressure, oil begins flowing into the sea in a massive and destructive slick.

"The Mexican government wastes time trying to figure out who is responsible for rescuing offshore platforms. They learn from the military that they have no way of recapturing the rig without the death of the hostages and destruction of the facility. A secret appeal is made to the United States, and the Pentagon replies that it can offer no way of rescuing the hostages. At the present time, we possess no capability for such an operation, at short notice.

Leftist activities

"Meanwhile, leftist affiliates on the mainland have tipped off the media to what is going on in the Bay of

ampeche, and the story makes front pages all over the world. The terrorists have thus gained a primary goal—publicity for their cause. "Ultimately, having no other choice, the Mexican government caves in to the demands and the hostages achieve safe passage to Nicaragua, the new communist revolu-

tionary base in the Caribbean.

"Farfetched? One only has to look at what terrorists have accomplished in the past to see that this is well within their capabilities."

Miller outlined several reasons why oil companies in particular are ripe targets for terrorism.

"First, people don't like oil compa-

nies. A goal of terrorism is to either gain the sympathy of the people by striking out at symbols of government and power or by scaring them into compliance. An attack on oil companies that successfully extorts money and even token 'aid to the oppressed' would be seen as a Robin Hood-like gesture.

A checklist for 'site hardening'

Dennis Hebler, vice president of Law Enforcement Training Associates, has spent nearly two decades training and working with American and European counter-insurgency and anti-terrorist units. He believes that "site hardening" is an important deterrent.

"In the initial preparation stages by the terrorists, several targets will be considered. Those targets showing signs of preparation, serious preparation, will be discounted in favor of easier hits."

He suggests the following management level preparations:

- A specific chain of command and decision must be set up incorporating officers of the company, government and military. Who will be negotiating with the terrorists? Who will have the authority to make decisions that may cost the lives of the hostages? Who will authorize military action?
- After the chain of command is set up, rehearsals and dry runs should be held to see how people react under the stress of action, where communication breakdowns occur, etc. One reason the British SAS recapture of the Iranian embassy in London was so successful was that British government and military leaders, including Prime Minister Thatcher, had been through two practice exercises.
- Key company personnel and government officials should be supplied with each other's off-duty telephone numbers. Information for counter-measures such as blue prints, photos of layout, equipment, workers, should be also readily available to security officials.
- Often prior to a terrorist assault, there is a build-up in propaganda aimed at the target. This is the basis for later "justification" of the terrorist act among leftists. Most countries have newspapers that sympathize or openly support dissident groups. Security should monitor these journals for changes in level or direction of rancor. If they begin to rail about "capitalist exploiters destroying our ocean reserves" it is a good idea to be alert.
- When unpopular government officials have a special link with a facility (i.e., a ribbon-cutting ceremony),

protection at the site must be maximized for several weeks afterwards.

On the platform itself:

- A system of recognition and emergency codes for all service aircraft must be established and changed on a frequent and regular basis so that no "surprise cargos" arrive on site.
- It should be remembered that protective safeguards at private aircraft facilities are not as effective or efficient as those at commercial airports. Company aircraft based in troubled parts of the world should bear no distinctive paint job or corporate logo that make identification easy.
- Security should make a careful pre-flight inspection of company aircraft before company personnel get anywhere near it.
- There must be some established method for rendering the helipad unusable or isolated from the rest of the facility in the event terrorists do try to land.
- Elementary as it may be, regular inspection of locks and alarms guarding sensitive areas is frequently overlooked.
- In regard to surface vessels, a no trespassing zone must be established and marked around each platform into which no vessel without proper recognition codes may enter.
- Underwater (scuba) demolition and assault are the most difficult to mount and the most difficult to protect against. A secure system of monitoring with the rig cameras and hydrophones can be devised. Host country military officials or private security consulting firms should be consulted for advice.
- Consideration should be given to arming selected site personnel with military style rifles, preferably automatic, and other weapons in high risk locations.
- Contingency plans and emergency procedures must be devised and rehearsed for possible terrorist action. Every worker on the platform must know what and what not to do in an emergency. □

"Second, oil is a foundation block in many pro-Western countries. Destroy that foundation and you aid the success of an unfriendly government taking over."

Finally, rich oil regions like the Middle East and Latin America have been and will continue to be targets for destabilization efforts by the Soviets. Diplomats may publicly hem and haw about it, but in intelligence circles, there are no doubts that the major terrorist and revolutionary movements of the world receive backing, training and assistance from the USSR.

Despite their likelihood as targets,

few private or national oil companies have made any preparations.

"As far as we know, only the British, in cooperation with the Norwegians, have made any plans for the rescue or recapture of North Sea platforms in the event of an attack by some group like the IRA. The British, however, do not seem to be exporting this expertise. At least one Arab country has been turned down in its request for assistance.

"The United States has no present fast-reaction capability. Group Delta (special joint forces anti-terrorism unit) has done exercises on offshore targets. It is so complex a procedure,

however, that they need constant training."

Effective response to the terrorist threat demands coordinated and committed cooperation between private companies, the nationalized companies and governments of the oil producing and oil consuming countries. Until this cooperation comes about, the industry is going to have to take the lead and make preparations on its own. □

Robert Charm is a Boston-based writer specializing in security and related subjects.

Experts map out potential terroristic territories

Richard Brokhausen, senior operations staff member for LETA and intelligence expert, worked extensively in counter-terrorism and counter-insurgency with various European and American military units before joining the company. He sees several areas of the world where terrorism activity is likely to surface during the next ten years:

The Middle East: Not surprisingly, this part of the world will continue to be a hot spot. The Palestine Liberation Organization has sworn revenge against the Arab countries who "betrayed" them while they were under seige in Lebanon. Coupled with this is the tremendous antipathy the Palestinians have toward the United States. American oil company executives and government oil companies belonging to pro-Western and moderate Arab states will be priority targets for kidnapping, assassination and sabotage.

Both Israeli and American intelligence sources believe that the more radical parts of the PLO may attempt something spectacular in the near future to make up for loss of face and the humiliation of the defeat in Lebanon. Historically, the Palestinians have always turned to ter-

rorism in the wake of military failure.

Iran will continue to be a wild card in the Middle East as it continues to disintegrate politically. Extremist religious and political factions will try to spread unrest in pro-Western/pro-American countries because anti-American feeling in Iran is stronger than ever.

Saudi Arabia, in particular, as well as other pro-West countries, will continue to be targets of destabilization efforts by the Soviets and their client Arab leftist groups. Saudi oil is a pillar of the Western economy and Saudi Arabia itself is a pillar of American Middle Eastern strategy. The Soviets know this and are working on it.

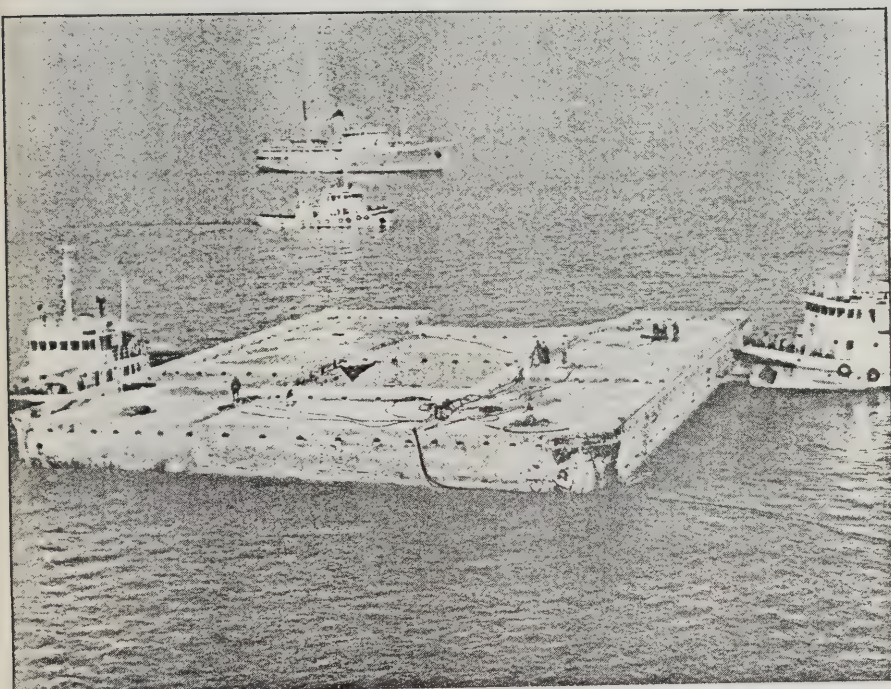
Mexico and Central America: The '80s may well be the decade of decision for this part of the world. Mexico is in extreme financial distress and a large, young, restless, poverty-stricken population is realizing that the "oil dream" of prosperity and jobs touted heavily by the government is not proving out. Left wing political and insurgent movements are growing and advisors from Nicaragua are known to be working among the people, particularly in the southern section of the country.

Nicaragua is the new main base of communist insurgency in Latin America. Resentment and anger at the failure of oil to bring prosperity as well as recognition that the government's fortunes ride on oil make the industry a natural target.

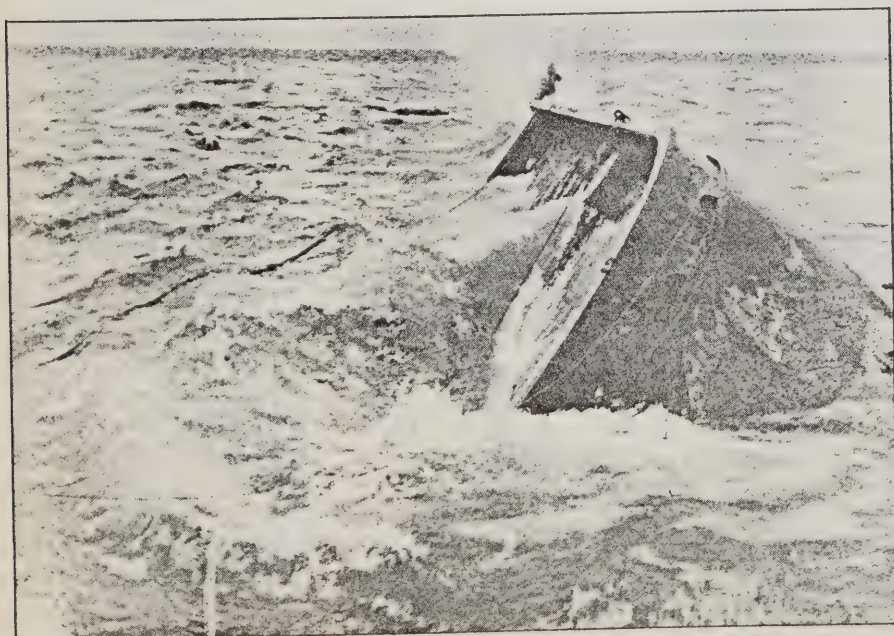
North Sea/Europe: Recognizing that the IRA is capable of increasingly sophisticated sabotage, the British have been making preparations and training elements of the SBS (Special Boat Service) to deal with assaults on the North Sea platforms.

The general attitude toward large multi-national corporations will be unfriendly as the resurgent European New Left (focusing on the anti-nuclear weapons and power) steps up its demonstrations and propaganda. Violent fringe groups could surface in the next few years, as any time you have a political cause that takes on the trappings of a crusade, a small percentage drift toward violent action in the belief that the end justifies any means. Indeed, this past spring, at a policy-formulating "congress," representatives of various political, peace and environmental groups voted that violence was an acceptable means of protest. □

Bohai 2 salvaged piece-by-piece



The mat of the Bohai 2 was towed to Yantai harbor following salvage in 1981.
(Photos by Zhao Bao Quan)



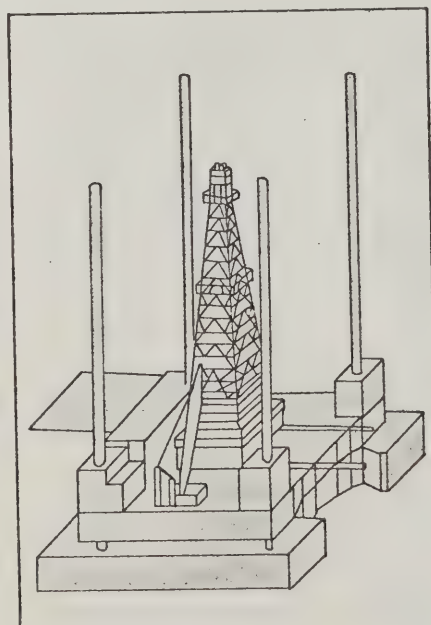
Salvage of the Bohai 2 required two years because of weather delays and the time required to cut up the mat and hull of the sunken jackup.

Dong Ding Shing
China Salvage Co.

The mat-supported jackup Bohai 2, sunk during a drillsite move off the People's Republic of China in 1979, was cut up and salvaged in sections, rather than intact, because recovery costs of the intact unit would have exceeded the future value of the unit. Recovery of the last sections of the jackup was completed in mid-1982.

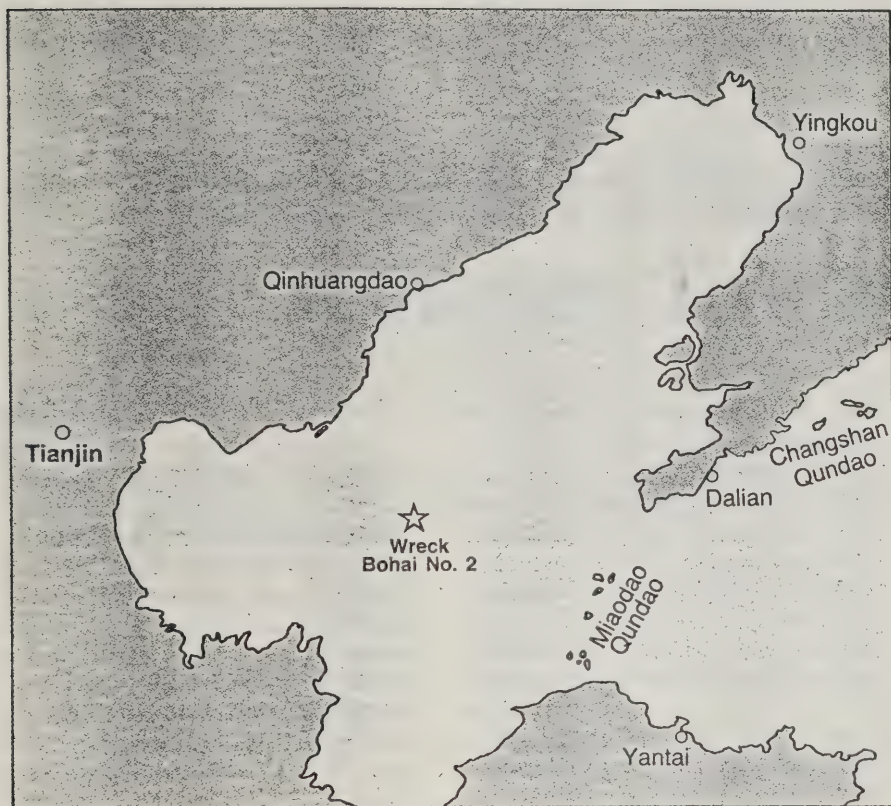
The first phase of the recovery operation was to cut away the mat from the overturned vessel. This was accomplished by setting simultaneous explosive charges around the spuds, which ranged in thicknesses of 44 mm to 54 mm. The mat and spuds, weighing about 1,560 tons, were smoothly refloated because of the buoyancy of the mat.

The second phase was use of electric arc and oxygen cutting units with

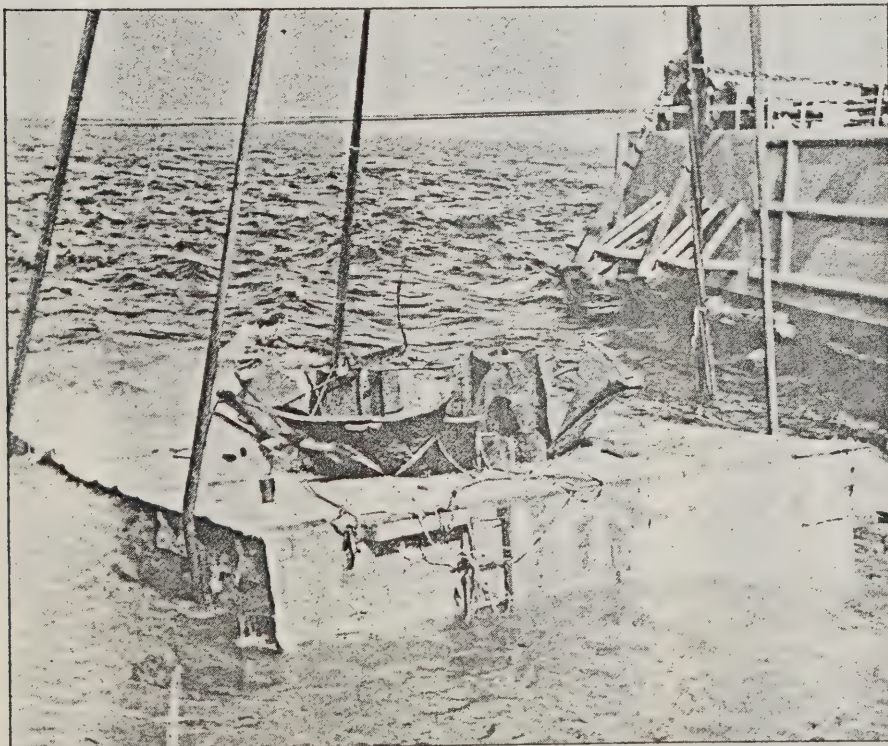


The diagram shows the shape of the original Bohai.

**Bohai 2 was cut up and salvaged
in sections because
recovery costs on the intact unit
would exceed its future value.**



The Bohai 2 sank in 25 m of water in Force 10 seas during a site move on November 24, 1979. Only two of the 74 aboard were saved.



Part of the salvaged hull of the Bohai 2 is lifted by a derrick barge. The hull was cut into five pieces for transport.

explosives to separate the engine room, pump room, starboard and port cabins from the hull. The sections were then lifted clear of the hull.

Phase three involved cutting the hull along the mid-line, and then cutting the forward section into three pieces, and the aft section into two sections. These were then lifted by crane barge to complete the salvage.

Condition of hull

The Bohai 2 went down in 25-meter water depths. A wreckage survey indicated the vessel had overturned with the mat's bottom facing the surface.

The upper part of the superstructure was buried, with the drill mast and some of the spuds fractured. The platform was lying at about 6° trim and 8° of heel.

The sea floor consisted of light silt with sand and clay. The adhesion force was estimated at 0.3. Surface currents ranged from 2.2 knots in flood to 2.0 knots in ebb. Bottom currents were 1.6 knots and 1.4 knots, respectively.

Causes of sinking

The Bohai 2 had just completed a well in the Bohai, about 50 miles off Tianjin, for the Petroleum Corp. of the PRC. The vessel was being towed by the Bhinhai 282, a supply/anchor handling vessel rated at 8,000 hp, to a new site when it encountered Force 10 weather conditions.

Waves running over the deck of the jackup sheered off a 1.1-meter-diameter pump room ventilator on the port deck. Seawater flooded the pump room, and the entire unit capsized about 73 miles from Qinhuangdao. Only two of the 74 workers aboard were saved.

The Bohai 2 bought the unit in 1973 from Japan Drilling Co., which had originally built the vessel in 1969. The unit consists of a mat and four jacking spuds.

The hull measures 63 meters in length by 38 meters in breadth by 5.5 meters in depth. The weight of the unit fully loaded is 11,297 tons. Operating depth parameters of the vessel are 5 meters minimum and 53 meters maximum. □

Special extinguishers dampen fire risks

Phil Supple
Tony Bedlow
Chemetron Fire Systems

Offshore oil platforms, because of their isolation and nature of operation, present abnormal hazards to personnel, equipment and structure, accentuated by severe environmental conditions. Because of the concentration of risks, it is essential that fire in any area be brought under control quickly.

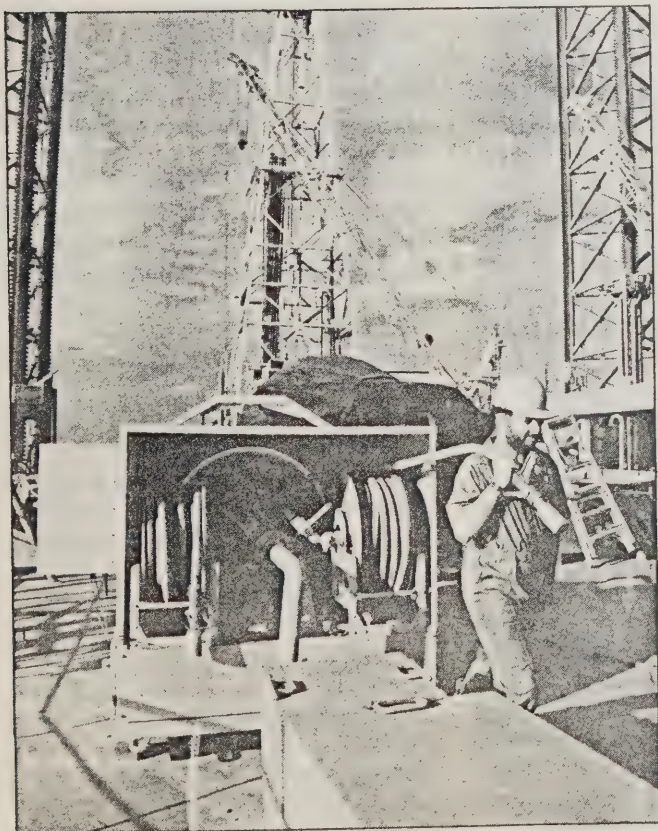
In the case of spill fires, for exam-

ple, this will mean extinguishment by water, foam and/or dry chemical. On the other hand, if gas under pressure is ignited, it is probably more prudent to allow the gas to burn while simultaneously applying large volumes of water through fixed water spray and deluge systems and high volume water monitors to control the burning and cool exposed modules and structures.

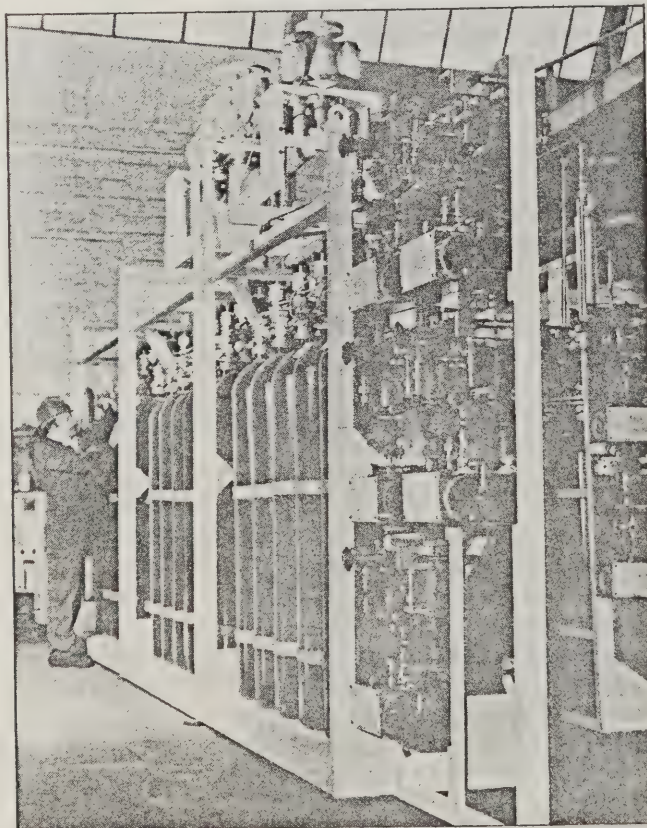
The use of fixed fire extinguishing systems on offshore platforms will vary depending on the type of plat-

form, the environment, owner/operator preferences, insurance requirements and local legislation of the country in whose waters the platform is operating.

Further variation in risk will depend on whether the structure is manned or unmanned, whether accommodation modules are included, whether the platform is used to control liquid hydrocarbons in combination with large volumes of gas under pressure, or whether the platform controls gas only.



Offshore platforms also utilize fire-suppression systems such as the Chemetron Fire Boss, an aqueous film-forming foam (AFFF).



A bank of Halon 1301 cylinders will have a group of agent cylinders manifolded together and connected to a common discharge line.

Brae platform

On board Marathon Oil's platform being built for the North Sea's Brae field, Chemetron Ltd. Fire Systems has designed and supplied a fixed fire suppression system using Halon 1301, a dry chemical.

In a typical fixed system such as this one, a group of agent cylinders is manifolded together and connected to a common discharge line and to nozzles in an enclosed space. By incorporating selector valves, the piping can branch to nozzles in other spaces. However, a single bank normally serves more than one area on an individual basis only, not simultaneously. The agent storage capacity is determined by the largest space to be protected.

Each system area has its own bank of cylinders. There are 86 cylinders aboard the Marathon platform, including the reserve supply, mounted on skids in the various modules.

Hazard areas

Aboard the Brae platform, there are 33 hazard areas under Halon 1301 protection. They include the turbine, generator and alternator enclosures, communications and battery rooms, central computer room and diesel generator room.

Each fixed system installed on offshore rigs will usually include an indication of operational status of the system and whether the system has been operated, facilities to temporarily lock off or deactivate the automatic function in an automatic/manual system. Where a number of spaces are each protected by a fixed system, operating these systems from a control point should be considered.

Clearly audible and, if necessary, visual warning must be given within the space both prior to and during release of the agent. The system should have self-monitoring potential, enabling detection of electrical faults by suitable alarms, and a system with remote and/or automatic release should be capable of local manual operation.

To quickly develop the required agent concentration throughout a protected space, all cylinders are designed to actuate simultaneously. Since Halon 1301 gas will escape through any opening, the system is designed to automatically close doors, windows and shutdown ventilation.

There are two basic methods of applying an extinguishing agent to a fire:

- **Local application:** The nozzle is positioned in a space or aimed (by hose reel) allowing the agent flow to concentrate on the hazard, such as a pump. This can be done either in an open or enclosed space, and any fire extinguishant can be used.

- **Flooding discharge:** Commonly used with Halon where the agent is expelled from a multi-directional nozzle and expands under pressure to flow into all areas of an enclosed space.

A gaseous agent such as Halon, used to totally flood an enclosed space, is generally considered to be the most efficient way to extinguish a fire, usually in as little time as 10 seconds.

A gaseous agent is especially useful in protecting control rooms because it is nonconducting in the presence of energized electrical equipment.

Under certain conditions, it is unnecessary to shut down any controls or automatic equipment. A gaseous agent normally won't harm the contents of the space, and unlike water, foam or dry chemical agents, gas is easily removed by normal ventilation equipment.

Halon gas

Halon 1301 is a liquid when stored in cylinders under pressure and is super-pressurized with nitrogen to achieve expellent pressure.

In the Brae platform system, the cylinders are super-pressurized to either 360 or 600 psig. While the 360 psig pressure is adequate for many systems, the 600 psig pressure can better accommodate spaces requiring longer pipe runs and extensive branching to nozzles in separate hazard spaces.

Each cylinder is supplied with a valve or release device to manually discharge the contents. A pressure gauge is also provided for visual indication of condition within the cylinder.

The cylinder pressure is subject to change with temperature variations. A container initially pressurized to 360 or 600 psig at 70°F can read lower at lower temperatures without having lost any of its contents. Conversely, it can read higher at warmer temperatures.

When expelled, Halon expands to a gas to extinguish flames in enclosed spaces. It protects against the same

hazards as carbon dioxide, except that it is not as effective for deep-seated fires or internal burning. However, this limitation is probably not significant on offshore structures.

Halon 1301 differs from CO₂, also a gaseous agent, in that it extinguishes fire by a chemical "chain-breaking" of the combustion process. In suppressing a fire, the Halon breaks down and the amount of breakdown product should be minimized, requiring a fast discharge (10 seconds or less) to extinguish a fire quickly.

Automatic features

Since early detection of flammable and poisonous gases, smoke and fire is essential on an offshore structure, most fixed fire extinguishing systems are actuated automatically through detection devices.

While conventional manual alarms and actuation controls are provided with every system, automatic sensing/activating devices are particularly effective in unattended spaces having any potential for fire.

Automatic operation is particularly important in North Sea platforms where closed compartments house facilities for production, drilling and compression—areas where vapors can accumulate and become hazardous before personnel become aware of the problem. Gas detection may be used to activate a system to inert the area where there is an excessive gas buildup and, therefore, preclude an explosion.

Detection devices commonly used on offshore structures include ultraviolet flame detectors, smoke and heat detectors and hazardous vapor detectors.

In most instances, one or more kinds of detectors may trigger any desired combination of functions, such as sounding an alarm, actuating a fire-extinguishing system, shutting down process equipment and displaying the location of a fire.

Ultraviolet detectors

Ultraviolet detectors are used for instantaneous response to flames. These units recognize certain characteristics of flames such as light intensity, flickering or radiant energy. Placement of UV sensors is important, since a flame must be directly in view.

The UV detector used on the Brae platform has the ability to discriminate against extraneous ultraviolet light from flare stacks, welding and

sunlight. The detector was designed to eliminate the false alarms caused by flare stacks, welding and sunlight which so often trouble offshore operators. Unlike most common UV detectors, the unit incorporates a novel gating principle that eliminates platform shutdowns.

UV detectors are used around the wellhead, separators, pig launchers and all sections considered high hazard where automatic deluge equipment is installed. These detectors are also used to automatically operate the deluge equipment, to sound an alarm, initiate certain shutdown operations and sound an alarm on the general platform.

Heat-actuated detectors

Electric heat-actuated detectors are generally used only in interior areas. They are not practical for outside use because wind carries heat away from a fire. There are two basic types:

- Fixed temperature, which triggers an alarm and controls functions when the detector temperature (not ambient temperature) reaches a preset value. This system is typically used in living spaces, storage and electric switchgear rooms. In living spaces, only an alarm is normally actuated.
- Rate-of-rise detector, which senses a sudden increase in the ambient temperature beyond a preset value. Both detector types are sometimes combined in the same system.

Smoke gas detectors

Smoke detectors can detect smoldering fires in interior spaces. The detector senses the presence of smoke particles in a monitored area. There are various types of detectors that perform this function, with photoelectric and ionization types generally used in offshore applications.

Gas detectors are used to detect a buildup of combustible or flammable vapors that could result in fire or explosion. Combustible gas detectors are used extensively on drilling and production units.

Unlike other detectors, gas detectors are generally wired to provide a warning. There are no control functions. The devices are sensitive to hydrocarbon vapors and are generally calibrated to signal when the concentration reaches 25% or more of the lower explosive limit or the point

where flammable vapors mixed with air can be ignited.

Sometimes, two types of detectors are combined in one system. For example, a gas or smoke detector can be used to provide warning. If the fire is not quickly extinguished with portable units, a heat detector can automatically release an extinguishing agent through the fixed system.

To prevent nuisance discharges, zoned wiring can be used. Two adjacent zones must sense a fire before actuating the system release of the agent. Abort control can be provided

to allow personnel to prevent agent discharge for small fires that can be handled with portable extinguishers.

Gas detectors are located in hazardous areas such as the wellhead, separators, sections containing gas lines, pig launchers, inlet ducts to less hazardous areas and exhaust ducts to high-hazard areas.

Vapor detectors are not normally located in workshop or accommodation areas. However, as a precaution they are fitted over entrances to these areas to detect possible ingress of flammable gas. □

Roth Cuts Offshore Production Losses

Of course your gas platform pumps don't look like this. Neither do ours.

On the other hand, if you are using reciprocating pumps for the liquids from a second-stage separator you can get this kind of shaking.

Offshore gas platforms don't like shaking. Shaking and vibration damage causes production losses. Production losses mean revenue losses.

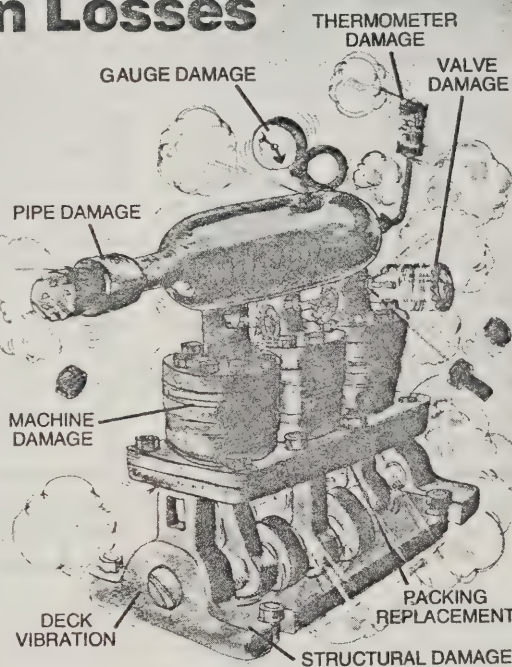
Roth Design LR pumps do not shake.

One Roth second-stage pump on a gas platform has been running for over six months without a maintenance shutdown.

It just continues quietly pumping liquid hydrocarbons at as low as 0.5 specific gravity. Not only that. It is pumping 105 gallons per minute with 4 foot available NPSH into a 1225 PSI pipeline. Suction pressure is 425 PSI.

The picture below is of two more Roth Design LR pumps on their way to a gas platform in the Arabian Gulf. They will be used to pump into a forty mile long pipeline to a shore based gas plant where there are more Roth pumps.

If you have a gas platform with pumps that shake, talk to the Roth people. We have been there and know how to cure the shaking. Phone: (309) 787-1791. Or telex USA 46-8440.



The high pressure plus

ROTH®
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"Certain valves I would consider mandatory to operation do not have an activator rod in the solenoids," Himes said. Other valves do not appear to have the rods inserted far enough to activate them, he suggested. "The only thing I can think of is that they were preparing them for use."

Captain Clarence Hauss first joined the Ranger on Jan. 25, 1982. Earlier evidence indicated he was responsible for a dangerous list on the rig, Feb. 6. Himes said Hauss told him he didn't want to learn that much about the ballast controls because he was only filling in temporarily.

Frank Jennings was the Ranger's senior ballast control operator. He told commissioners, he didn't know how to operate the emergency manual valves and didn't find out about them until four months after the rig sank. Jennings also couldn't understand why 18 of the valves were found open.

The most surprising evidence of the two weeks was given by Jennings. When he joined the Ranger in 1976 he had no ballast control training. Nevertheless, he was required to work shifts alone immediately. "I made mistakes lots of time. It took 18 months to be fully confident standing a shift alone."

He quit his job in 1981 for a number of reasons. A major contributing factor was the provincial hiring preference regulations. Jennings said he was concerned that good, experienced employees were being replaced by untrained Newfoundlanders.

These controversial hiring stipulations generated a great deal of testimony and cross-examination. The oil and gas regulations state 44% of a drilling rig's crew must be filled by unexperienced Newfoundlanders as soon as it arrives in local waters. Within one month of arrival this should increase to 65%.

Mobil Oil's east coast operations manager, Steve Romansky said, "In my opinion 65% within one month is too quick." The company agrees local people should be hired, but they have to be phased in gradually, he explained. "The rig didn't meet hiring standards between Nov. 1980, and Feb. 1981, because it couldn't."

During a dispute involving the regulations, provincial labor minister, Jerry Dinn, wrote to Mobil, "I wish to emphasize the seriousness with which our government views such disregard for our petroleum regulations, and the implications such a disregard could have for the lease issued to Mobil Oil Canada."

In spite of the letter's strong warning, a labor department official told the com-

mission, the regulations are merely guidelines and not meant to be followed strictly. ODECO lawyers questioned the director of the labor employment sector, Ed McCann, at length on his interpretation of the regulations and their practical application.

Company officials and the labor department have meetings to decide how many local workers will be hired, McCann explained. The department then provides a list of people it feels are qualified. The final hiring decisions are left up to the operator, he insisted. But, if non-Newfoundlanders are hired the operator must explain why.

McCann disagreed with an ODECO lawyer who called the regulations a quota system. The number of local workers hired depends on the availability of trained people, he said. When asked why the regulations used the word "unexperienced", McCann explained that it means not experienced on that particular rig, but having some offshore experience.

McCann said his department has learned from experience, and is now revising the regulations. When the Ranger sank on Feb. 15, 54 of the 84 man crew were Newfoundlanders. The department has 3,500 provincial workers registered, who say they have offshore experience.

Geoffrey Freeman, an inspector with the Canadian Oil and Gas Lands Administration, visited the rig on Feb. 3. He said everything seemed to be in order. On an earlier inspection, Freeman learned an entire roughneck crew had quit after a new worker cut off two fingers in the elevators.

A report filed by another COGLA inspector, said some crew members were not properly trained and lacked experience necessary to do their jobs. Miles Rajieie recommended a joint effort by all interested parties be made to ensure the overall safety on rigs.

Delmar Simpson, an electronics technician, said the Ranger's radio equipment and alarms were in good working order when he left the rig on Feb. 11. He installed a relay system which allowed fire and abandon ship alarms to be heard in the crew's quarters.

Earlier evidence revealed crew members turned down the public address speakers in their rooms so they could sleep. Simpson's over-ride, automatically turned the speaker volume up when an alarm was sounded. Simpson also said the radio's emergency distress signal was capable of sending out a mayday.

The commission has completed the first session of hearings.

OCEAN RANGER

Lack of training cited in Ranger hearing

by Joan Weeks

TESTIMONY LAST MONTH during Royal Commission hearings into the Ocean Ranger disaster focused mainly on Newfoundland's oil and gas regulations and evidence by the rig's two most senior ballast control officers.

Last July, commission divers brought up evidence from the sunken rig, including panels containing the emergency manual control valves. Evidence given at the USA Coast Guard inquiry indicated the electrical valves may have malfunctioned when water short-circuited a panel in the ballast control room.

Clifford Himes, who worked as a ballast operator from 1977 to 1982, was asked to comment on this evidence. A drawing of the manual system shows 18 of the 64 valves have brass activator rods plugged into them, 11 of which are on the starboard side.

SIXTH RIG FOR NOVA SCOTIA

New Japanese-built semi-submersible *John Shaw* will not be replacing the ill-fated *Ocean Ranger* off Newfoundland after all (see *OE* last month). Mobil Oil decided instead to assign the rig to Nova Scotia following early completion of drilling by another rig working off Newfoundland. *John Shaw* joins five other rigs working the Scotian shelf.

Mobil announced only in November that it expected to drill at least six new wells off Nova Scotia in a four-year exploration programme agreed with the province and Ottawa. Its partners in the venture are Petro Canada, Texaco Resources, Nova Scotia Resources and East Coast Energy.

Offshore Engineer

Jan. /83

P. 14

1983

Designers look to long-term monitoring

1983 will be a year of great challenge for the offshore industry as it attempts to weather the continuing recession. We are now well into a period of relatively low cost oil which will probably result in a modest boost in consumption but, because of potentially lower returns, less exploration. This trend, together with onerous tax environments, inevitably results in fewer projects and less work for design consultants.

Concurrently, I believe oil companies will continue to place more responsibility in the hands of designers. This is a satisfactory trend, as long as associated risks and liabilities are not out of proportion to the value of the design contract.

In the North Sea, enough operating experience has been gained to emphasise the necessity for structural reliability and low inspection and maintenance costs; a requirement that should be viewed in the context of inspection expenditures running into millions of pounds per annum for large structures in the northern North Sea. This requirement could have a major influence on the configuration of the next generation of offshore steel structures, which will have relatively far fewer members and nodes, arranged to facilitate the associated lower inspection requirements.

We may, as a result, see a renewed interest in self floaters of an advanced configuration which, by virtue of allowing for removal of large amounts of auxiliary buoyancy, would be designed for long term in-place requirements only, without the complication of launch trusses and other redundant framing required for installation. Such a configuration would retain the geometric simplicity of a traditional self floater without the drawback of large diameter flotation legs at upper levels.

For deepwater development, there will be a tendency for oil companies to seek reliable, thoroughly engineered, but innovative solutions, building upon existing technology. Thus I view this area as a particular challenge that will push the frontier for fixed piled steel structures out to at least 300m water depth, in conjunction with deck loads of up to 40,000t. Once again, a requirement for clean, simple structures will be evident.



John Brown-Earl and Wright's managing director Mike Hancock's personal view of design engineering trends for 1983.

As for marginal field development, while applauding the new technology being investigated, I feel strongly that a capability exists today, in the North Sea as nowhere else, to provide relatively inexpensive conventional but very reliable fixed structure solutions, both for platforms and for tanker loading, where mechanical problems and waiting-on-

weather have proven to be so costly. Conventional structures can benefit from recently developed technical improvements which result in significant reductions in life-cycle cost.

Structural designers will start to reap the benefit of the microcomputer revolution during 1983; the tendency for more elaborate (and more expensive) timesharing mainframe computer analyses should be offset, to a significant degree, by increased use of relatively inexpensive but powerful personal work station microcomputers and super-microcomputers. The benefit should be immediately realised in the development of shallow water jackets.

As a design consultant, I encourage operators to monitor the dynamic response of their structures, during both the installation and operating phases, and to feed the information obtained back to the designer. Only in this way will designers be in a position to improve the effectiveness of their designs. Long-term monitoring of structural behaviour, linked to analytical techniques, can result in a more cost-effective approach to inspection requirements and, for ageing structures, a more assured path to re-certification or qualification of reliability □



Electronics in the offshore industry is going in two different directions. On one hand there are moves toward larger communications over greater distances, while on the other smaller hardware is taking on progressively more work in production control, navigation and geophysical exploration. In this special feature OE looks over this rapidly expanding field.

Satellites set to sidestep offshore communication logjam

Satellite communications for UK offshore platforms could be just over the horizon. Although widely used on ships and rigs, satellite communications between fixed installations may be more problematic. Capital investment would be very high but so is the quality of the current systems. British Telecom International (BTI) is now demanding firm guidelines from the industry about what sort of service is going to be required at what cost.

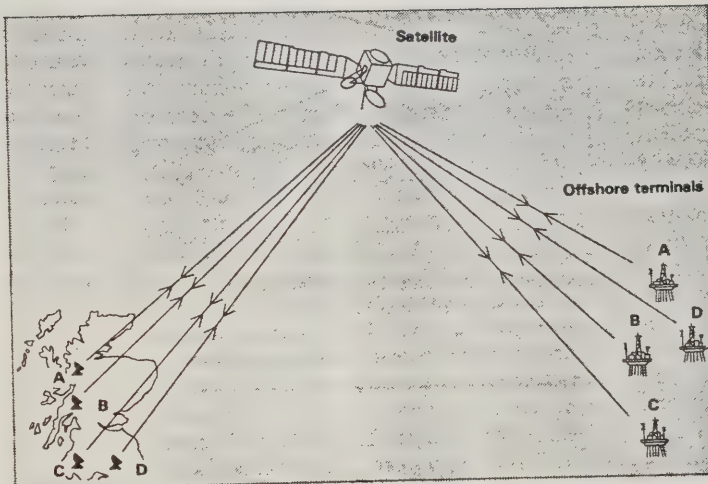
At present Amoco's Montrose platform is the only fixed installation in the UK sector with a satellite terminal (see OE October 1982). Mobile rigs and vessels already use a lot of satellite time.

According to Robert Eichberg of Comsat Maritime Services nearly 80% of all seismic ships are equipped with ship earth stations. Twenty-one offshore construction spreads and their supply boats are using Inmarsat services.

By September 1982, 1,382 ships had been fitted with satellite terminals, of which up to 60% are directly involved with the hydrocarbon industry. Eighteen drilling rigs have been fitted with Inmarsat terminals since January 1981 when Palmer EaE first started to install them.

Worldwide, 103 mobile rigs have ship earth stations. Confidential and urgent well data transmissions plus over-the-horizon drilling locations have prioritised the use of satellite communications by the exploration sector, while production installations lag far behind.

This situation is unlikely to last for very much longer. In 1985 a NAM platform is



Small dish shore terminal configuration, one of the proposals from British Telecom International for satellite communications from fixed offshore installations. An alternative proposal would have all platforms communicating with a single large dish onshore.

planned for F3, a northern block offshore The Netherlands, which will carry a satellite earth terminal. The sector is currently covered by line-of-sight/microwave (los/m), but the Dutch telecommunications authority has leased two Inmarsat terminals to an oil company for use in exploration on the northern blocks.

The Norwegians, with an extremely long and remote coast line, have seen the need for offshore satellite communications for some time and have already established one of the world's five existing Inmarsat coast earth stations at Eik. The other four stations are in Japan and the US. For the same reason Norway is the fourth largest investor in Inmarsat with an equity share of nearly 8%, a larger investment than Japan and behind only the US, USSR and UK.

With an easier geographical situation than Norway, UK offshore production communications consist almost entirely of

los/m or tropospheric scatter (tropo) for transmissions over the horizon.

Tropo is a still unexplained reflection of radio waves in the tropospheric layer. This produces a tiny signal of very high quality. Even with the enormous degree of amplification necessary, it still gives 99.98% reliability.

'Why in view of the quality of tropo links, have BTI carried out studies in depth on the use of satellites offshore?' asked BTI chief engineer David Withers in his keynote address to an offshore oil communications seminar in Aberdeen last October.

'We are doing so because we believe that you will soon be making demands on your communication facilities that tropo cannot supply. In 1973 you told us that data bit rates of 1,200 bits per second would never be needed. Today 2.4 and 4.8kbits/s are commonplace and some of you have successfully used 9.6kbits/s. However the tropo systems we are using are rather long and even higher speeds at acceptable error rates are probably not feasible.

'Future production fields may be opened up even further from land and tropo of any kind would then be unreliable or impractical. Even substantial growths of systems covering the distances we span may now be difficult to arrange because of radio spectrum limitations. Satellites would enable us to sidestep these problems'.

This does not mean that tropo will become a thing of the past. BTI and the UK offshore operators have already invested more than £40 million in the current system. For this money, five of the seven UK



has followed relative to the launch point and worksite so that he can determine if his umbilical has twisted round a jacket member. He might also like to see the track he would follow if he held his present control settings.

It seemed well within the capability of modern computing and graphics to provide such a display. Ferranti was therefore asked to look at the problem. The study analysed in detail the method of operation of a computer generated display system and determined the cost of a range of options of varying complexity. The facilities offered at three approximate price levels, £25,000, £15,000 and £5,000, were examined.

The best buy was found to be a custom built graphics system which would be a simple self-contained peripheral to the user's existing computer, storing inputs on position and velocity and displaying information such as direction, speed of motion, predicted course and track history on a map of the locality or diagram of the

structure using a colour monitor. The cost could be in the region of £7,000. The Kalman filter trials will incorporate a simple example of the concept.

The preliminary studies had revealed a need for some additional sensors. In particular there was no reliable means of measuring vehicle velocity. Velocity measurements could be used with heading data to carry out navigation by dead reckoning which would be particularly valuable for providing continuous position information between more accurate fixes from other sources. Velocity data may also be needed for an autopilot, or to update an IN system.

Doppler sonar, which calculates velocity from the frequency shift caused when a sonar beam transmitted from the vehicle is reflected from the seabed or the surrounding water mass, has proved unreliable when the vehicle is close to the seabed, or manoeuvring rapidly. Although it seemed that these deficiencies could be

reduced by commercial developments then in hand, investigation of alternative techniques seemed advisable.

Two concepts were studied by Ferranti with help from Sira Institute. The laser velocimeter is similar to a Doppler sonar, but uses a laser instead of an acoustic beam. The output of the laser is split into three separate beams in a tripod array. Reflections from a nearby object are compared with reference signals so that the three components of the vehicle velocity can be computed. The system was shown to be feasible over ranges of a few metres. Both power requirements and costs were predicted to be high. Consequently the system had limited attractions.

The tv autocorrelator showed much greater promise. Images from a pair of parallel mounted tv cameras are processed digitally to extract range and lateral movement of the vehicle relative to prominent features in the field of view. The principle could be applied to measuring distance travelled along a member or pipe, but perhaps of greater value it could be used in a precise hover control.

The pilot could then park the vehicle hands-off to provide thinking time between actions or to enable him to concentrate his efforts on a delicate operation. Costs excluding cameras promised to be modest, perhaps equivalent to another camera.

The final navigation project so far undertaken through the Underwater Initiative was to see what use could be made of sonar inside a jacket. Sonar scanning horizontally has become accepted by vehicle operators as a means of detecting range and bearing of an object outside visual range.

It might be possible to take the sonar images from a 360° scan by a sonar mounted on a vehicle inside a jacket and match them by computer techniques with a cross section plan of the jacket to calculate a unique position fix. British Aerospace Dynamics Group (formerly Sperry Gyroscope) has recently begun an investigation of this concept.

The work carried out so far has revealed that considerable improvements in navigation instruments and display of data are possible which would greatly increase the efficiency of underwater operations. The advice of industry has been sought throughout the programme through a navigation project steering group, comprising representatives of potential customers, which has in some cases altered the direction of the work. OSO hopes that some of the promising concepts that have been studied will soon become commercial products.

CSSRA Urges Adoption Of Canadian Building Policy

The Canadian Shipbuilding and Ship Repairing Association (CSSRA) recently held its semi-annual general meeting in Ottawa. The CSSRA represents 25 shipbuilding and ship repair firms and 72 allied industries from coast to coast. Meetings of the board of directors and allied members were also held.

The board of directors noted that Canada's new shipbuilding policy is now two years and five months overdue. During the same period over \$1.1 billion (Canadian) worth of domestic shipbuilding work has gone to foreign shipyards. With a sensible shipbuilding policy in place during that period, the CSSRA noted, most of that lost work would have stayed in Canada and instead of adding to the unemployment rolls, shipbuilding would now be helping to solve the problem.

The CSSRA urged the government to delay no longer on a positive shipbuilding policy, otherwise it is likely that further orders will go abroad to seriously damage the viability of the industry to respond to the exciting possibilities for shipbuilding in the longer term, e.g. Beaufort and East Coast offshore developments, the Polar 8 icebreaker, and the Canadian patrol frigate program.

The association believes that Canada should receive a greater measure of industrial benefits as a result of the export of natural resources now being shipped almost exclusively in foreign bottoms. There is great potential for shipbuilding and allied industries in filling the need for the

carriers of these resources whether they be wheat, coal, liquefied natural gas, and other renewable or non-renewable resources. The CSSRA recommended that the government, as well as private sector exporters, examine the potential for shipbuilding sales and industrial benefit offsets, when negotiating export sales of Canadian natural resources.

The association discussed a report regarding Minister of Fisheries and Oceans Pierre DeBane, in which he is quoted as reviewing the issuance of new fishing licenses on the East Coast. To the astonishment of CSSRA members, it was reported in the press that he is considering the opening of the door for Nova Scotia and other Atlantic Canadian fisheries interests to acquire some used fishing trawlers now available in Europe at knock-down prices.

The CSSRA stated it trusts that this report is inaccurate because the association deplores the dumping of foreign vessels into Canada and its seeming support by a Minister of the Crown. The Canadian shipbuilding and allied industries need work now, the CSSRA noted, adding "There has been enough exportation of jobs in shipbuilding over the last 21½ years without more negative policy initiatives such as bringing in used fishing trawlers."

The CSSRA also reported that the Canadian Department of Fisheries and Oceans is considering the purchase of a Japanese-built fishing freezer trawler, the M.V. Callistratus, for conversion as a fisheries research vessel. The Association asked the government that it honor its commitment and policy to build in Canada for Canadian Government ship requirements.

maritime Reporter

Jan 15/83

P. 10

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